Project/Site Name: WV Chemical Leak	Site Address:	1015 Barlow Drive.	Charleston.	, WV 25311
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03049.0.001.134.01.RS.A3XK

Project Number: TL01-14-01-001 Project Manager: Gene Nance Phone: (304) 830-1442



TechLaw, Inc. HEALTH and SAFETY PLAN

WV Chemical Leak, Charleston, WV 03049.0.001.134.01.RS.A3XK 1/18/2014

Project Safety Plan Written By	Jocelyn Welshhans	Environmental Scientist	1/18/14
	Name	Title	Date
Project Manager Approval	Gene Nance	Project Manager	1/21/14
	Name	Title	Date
H&S Review Concurrence*	Michael D Walters, ScD, CIH, PE	Health & Safety Director	February 3, 2014
	Name Michael D. Walters	Title	Date

^{*}Approval must be given by the H&S Director, or any TechLaw Certified Industrial Hygienist (CIH), Certified Safety Professional (CSP), or their chosen designee.

1. Scope of Work	
Dates of the work:	1/10/14 – 6/30/14 (TDD end date)
Scope of work: (Type of activity, expected tasks, methods/procedures, order of events, etc.)	Assist the EPA OSC in Emergency and Removal Assessment work at the Freedom Industries Facility in Charleston, WV. Provide Technical Support in evaluation of the chemical spill. Provide air, water, and soil sampling support as needed. Assist with documentation, both written and photographic.
Agency Involved (regulations): Site Regulatory Status: (i.e. 1910, 1926 or State) Governing Agency: (i.e. EPA, DOE, State, USACE, NPL Site, NRC, Air Force, OSHA, etc.)	EPA; START; WVDEP; Chemical Safety Board; USCG; Attorney General; National Guard; WVDHHR.
Identify site contaminants: (If present, how was it determined that exposures will be below OSHA PEL or NIOSH RELs?) Please provide exposure limits if available. If none are known, site sources used to arrive at this conclusion. Please provide OSHA or MSDS information for all contaminants	Crude MCHM 4-methyl-1-cyclohexanemethanol Dimethyl 1,4-cyclohexanedicarboxylate Methanol 1,4-Cyclohexanedimethanol Liquid Calcium chloride Glycerine PPH, stripped DOWANOL TM PPH Glycol Ether DOWANOL TM DiPPH Glycol Ether
	See attached MSDS for each

Site description:

(Physical details, i.e., acreage, topography, vegetation, type of facility, usage history, distance from pop. center, access routes, etc.)

A state of emergency was declared for nine counties in West Virginia (Boone, Cabell, Clay, Jackson, Kanawha, Lincoln, Putnam, and Roane) due to a chemical spill at the Freedom Industries Facility in Charleston, WV. The spill leaked crude MCHM and PPH, which made its way into the Elk River approximately 1.5 miles upstream from the WV American Water Company surface water intake. A "do not use water" order was placed in effect for customers of the WV American Water Company. The order reportedly affected approximately 300,000 persons.

The Site consists of the Freedom Industries Facility located at the former Etowah River Terminal in Etowah, Kanawha County, West Virginia, and the affected areas of the Elk River. The Site consists of one breached tank which contained MCHM, the potential chemicals and MCHM-contaminated soils beneath the tank, the soils along the pathway to the Elk River, and the affected portions of the Elk River. Due to a breach in the tank and failure of the secondary containment around the tank, the chemical reached the soil and river.

The parameters of the Site are continuing to change as the extent of the leak becomes more defined.

Task: Mobilization	Hazard(s): Sprains and Strains; Tiredness;	Mitigation/Hazard Controls: Use proper lifting techniques when loading equipment. Use mechanical assistance when possible. Team lift heavy equipment and supplies. Travel when well rested. Be aware of the road conditions and the other drivers on the road. Be
	awareness	aware of ice and snow on roadways.
		Required PPE: n/a
Task: Air Sampling Hazard(s): Slip, Trip, and Fall; Flora and Fauna; Equipment operators; Cold Stress		Mitigation/Hazard Controls: Be aware of the surroundings. Watch for uneven terrain when walking the site. Be aware of ice and snow which would make for treacherous footing on site. Mark any areas that may present the potential for slips, trips, and falls. Dress appropriately for the weather. Dress in layers to accommodate the change in temperature between indoor activities and outdoor activities. Have rain and snow gear available for use if the conditions arise. Be aware of insect and plant life around the site and watch for poisonous or toxic plants or insects. Be aware of wildlife and avoid contact with wildlife. Make eye contact with any heavy equipment operators and remain in their line of site when moving around the site. Mark any sampling areas and be aware of work on the site around the sampling activities.
		Required PPE: Modified Level D – Hard hat, safety glasses, safety vests, steel toe boots, long sleeves, long pants, chemically resistant gloves
Task: Water Sampling Sampling Water Sampling Slip, Trip, and Fall; Flora and Fauna; Equipment operators; Cold Stress		Mitigation/Hazard Controls: Be aware of the surroundings. Watch for uneven terrain when walking the site. Be aware of ice and snow which would make for treacherous footing on site. Mark any areas that may present the potential for slips, trips, and falls. Dress appropriately for the weather. Dress in layers to accommodate the change in temperature between indoor activities and outdoor activities. Have rain and snow gear available for use if the conditions arise. Be aware of insect and plant life around the site and watch for poisonous or toxic plants or insects. Be aware of wildlife and avoid contact with wildlife. Make eye contact with any heavy equipment operators and remain in their line of site when moving around the site. Mark any sampling areas and be aware of work on the site around the sampling activities.
		Required PPE: Modified Level D – Hard hat, safety glasses, safety vests, steel toe boots, long sleeves, long pants, chemically resistant gloves

Task: Soil Sampling	Hazard(s): Slip, Trip, and Fall; Flora and Fauna; Equipment operators; Cold Stress	Mitigation/Hazard Controls: Be aware of the surroundings. Watch for uneven terrain when walking the site. Be aware of ice and snow which would make for treacherous footing on site. Mark any areas that may present the potential for slips, trips, and falls. Dress appropriately for the weather. Dress in layers to accommodate the change in temperature between indoor activities and outdoor activities. Have rain and snow gear available for use if the conditions arise. Be aware of insect and plant life around the site and watch for poisonous or toxic plants or insects. Be aware of wildlife and avoid contact with wildlife. Make eye contact with any heavy equipment operators and remain in their line of site when moving around the site. Mark any sampling areas and be aware of work on the site around the sampling activities.
		Required PPE: Modified Level D – Hard hat, safety glasses, safety vests, steel toe boots, long sleeves, long pants, chemically resistant gloves
Task: Documentation	Hazard(s): Slip, Trip, and Fall; Biological; Flora and Fauna; Equipment operators; Cold Stress	Mitigation/Hazard Controls: Be aware of the surroundings. Watch for uneven terrain when walking the site. Be aware of ice and snow which would make for treacherous footing on site. Mark any areas that may present the potential for slips, trips, and falls. Dress appropriately for the weather. Dress in layers to accommodate the change in temperature between indoor activities and outdoor activities. Have rain and snow gear available for use if the conditions arise. Be aware of insect and plant life around the site and watch for poisonous or toxic plants or insects. Be aware of wildlife and avoid contact with wildlife. Use hand sanitizer and proper hand washing techniques to avoid cold and flu germs. Make eye contact with any heavy equipment operators and remain in their line of site when moving around the site.
		Required PPE: Level D – Hard hat, safety glasses, safety vests, steel toe boots, long sleeves, long pants

3. Emergency Contacts						
Fire 9		911		Non-emergency: (304) 348-8137		
Police		911		Non-emergency: (304) 348-6801		
Medical		911		Non-emergency: (304) 345-2312		
Client Contact: Dennis Matlock		Office #: (304) 234-0284		Cell #: (304) 280-7500		
EMERGENCY Nearest Hospital		Name: Charleston Area Medical C	ame: Charleston Area Medical Center		Phone #: (304) 388-5432	
Address & Directions to Nearest Hospital (Map Attached? ☑ YES ☐ NO)		Address: [501 Morris Street Charleston, WV 25301		Directions: See Attached Map		
NON-EMERGENCY Nearest Occupational Health Clinic		Name: MedExpress Urgent Care - Charleston		Phone #: (304) 925-3627		
Address & Directions to Nearest Occ. Health Clinic (Map Attached? ☑ YES ☐ NO)		Address: 5430 Maccorkle Ave SE Charleston, WV 25304		Directions: See Attac	irections: See Attached Map	
Responsible Personnel	unii					
Project Manager Gene N		Nance Office #: N/A			Cell #: (304) 830-1442	
Site Safety Officer	Site Safety Officer Lead S		T on-site (varies) Office #: (varie		Cell #: (varies)	
TechLaw Health and Safety Director	TechLaw Health and Safety Director Michae		el D Walters, ScD, CIH Office #: 781-2		Cell #: 781-454-8713	
TechLaw Health and Safety Officer	Bryan I	Berna	Home #: 360-8	371-8787	Cell #: 360-550-3399	
TechLaw Medical Consultant	TechLaw Medical Consultant Mark S		Office #: 850-393-3613		PM #: 800-943-2944	



4. List Applicable TechLaw SOPs		
02-03-04 Field Procedures - Equipment Decontamination	03-01-04 Field Documentation – Maintaining a Field Logbook	04-01-02 Packaging and Shipping - Preservatives
02-05-04 Field Procedures - Chain-of-Custody	03-02-05 Field Documentation Procedures - Taking and Documenting Photographs	04-02-02 Packaging and Shipping Procedures – Environmental Samples
02-06-06 Field Procedures - Analytical Support and Laboratory Selection	03-04-04 Field Documentation Procedures – Field Oversight	05-03-02 Field Equipment Operation and Maintenance Procedures - Organic Vapor Analyzers
07-08-01 Soil/Sediment Sampling and Analysis Procedures - Sampling for Volatile Organic Compounds	08-02-03 Standard Operating Procedures - Surface Water Sampling and Analysis Procedures	05-07-01 Field Equipment Operation and Maintenance Procedures - Photoionization Gas Analyzers
09-03-04 Health and Safety Procedures - Personal Protective Equipment	09-05-03 Health and Safety Guidelines - Cold Stress Control	09-07-04 Health and Safety Procedures - Communications
09-12-01 Health and Safety Procedures – Hazard Communications Program		

5. TechLaw Field Team Members and Required Training for this Project			
Team Member Name(s)	Training/Qualifications	Signature of Team Member	
William Huggins	OSHA HazWoper, First Aid/CPR, Bloodborne Pathogens		
Michelle Dallessandro	OSHA HazWoper, First Aid/CPR, Bloodborne Pathogens		
M. Gene Nance	OSHA HazWoper, First Aid/CPR, Bloodborne Pathogens		

Jocelyn Welshhans	OSHA HazWoper, First Aid/CPR, Bloodborne Pathogens	
W. Matthew Gadd	OSHA HazWoper, First Aid/CPR, Bloodborne Pathogens	
Suddha Graves	OSHA HazWoper, First Aid/CPR, Bloodborne Pathogens	

6. Site Specific Equ	. Site Specific Equipment: (equipment not conventionally used for field work, or is unfamiliar to the assigned team members)		
Item:	Hazard(s):		
	Mitigation/Hazard Controls:		
Item:	Hazard(s):		
	Mitigation/Hazard Controls:		
Item:	Hazard(s):		
	Mitigation/Hazard Controls:		

<u>Health & Safety Plan Checklist.</u> Checklist is not part of HASP – Do not take off-site or bring to Project Site. Initially the checklist will be posted with the HASP on SharePoint.

Include Site Map, Directions to Site and Map of planned route to site.

Emergency Response Information – Directions to Site, Directions to Hospital

Contaminants of Concern – Attach MSDSs of appropriate Contaminants

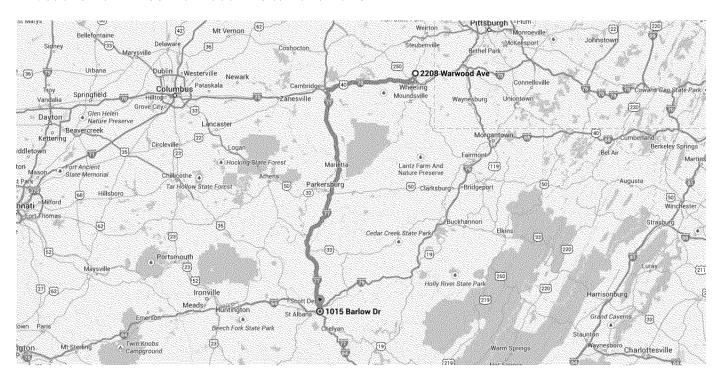
July 2011

Google Maps Page 1 of 2

Google

Drive 182 mi, 2 h 45 min

Directions from 2208 Warwood Ave to 1015 Barlow Dr



O 2208 Warwood Ave

Wheeling, WV 26003

Get on I-70 W/US-40 W in 2 from Warwood Ave and River Rd

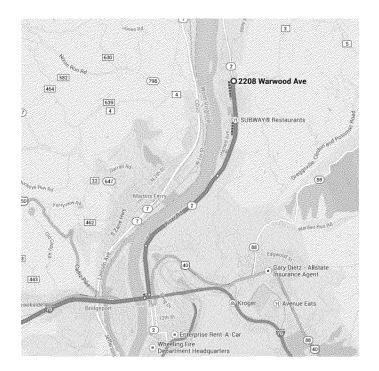
1. Head south on Warwood Ave toward N 22nd St

1.6 mi
2. Continue onto River Rd

1.6 mi
3. Continue onto N Main St

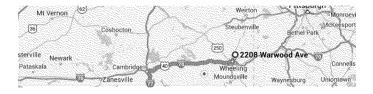
0.8 mi
4. Take the Interstate 70 W/US 40 W ramp to Columbus

0.1 mi



Follow I-70 W and I-77 S to Crescent Rd in Charleston. Take exit 102 from I-77 S

176 mi / 2 h 32 min

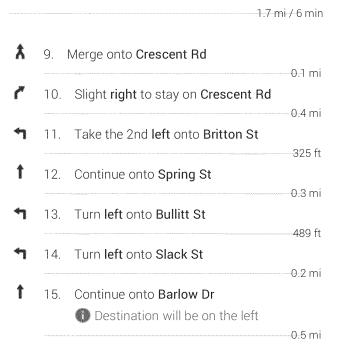


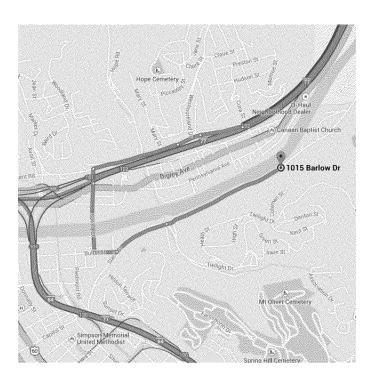
Google Maps Page 2 of 2

*	5.	Merge onto I-70 W/US-40 W Continue to follow I-70 W Entering Ohio 46.4 mi
700	6.	Take exit 180A for Interstate 77 S toward Marietta
*	7.	Merge onto I-77 S ① Entering West Virginia
7	8.	Take exit 102 toward US-119 N/Westmoreland Rd
		0.2111

Logan Hocking State Forest Athens V State Forest Athens V State Forest Athens State Forest Athens State Forest Athens State Forest Athens State Parkersburg Athens Athens Athens State Parkersburg Athens Athens

Continue on Crescent Rd. Take Spring St to Barlow Dr in 1





1015 Barlow Dr

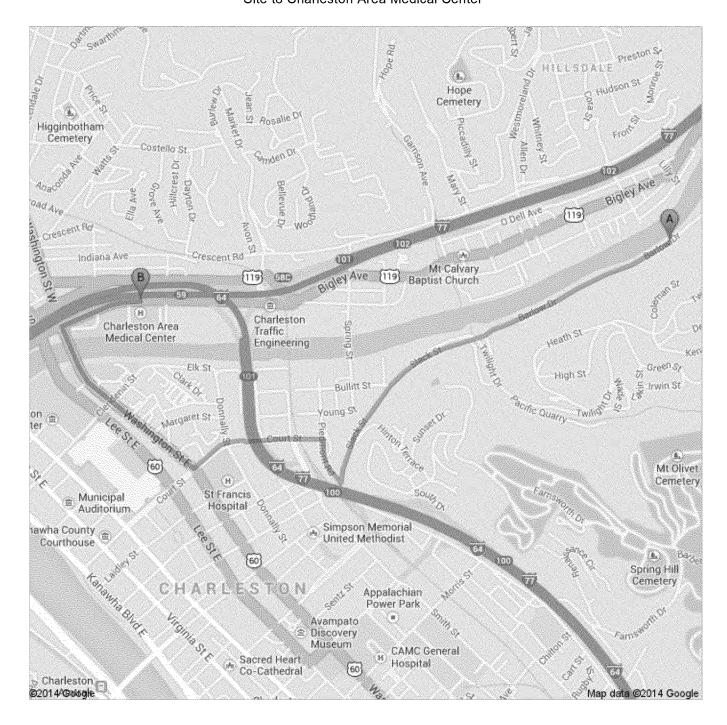
Charleston, WV 25301

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Map data ©2014 Google



Directions to 501 Morris St, Charleston, WV 25301 2.2 mi – about 6 mins Site to Charleston Area Medical Center





1015 Barlow Dr, Charleston, WV 25301

go 0.5 mi
total 0.5 mi
go 0.5 mi
total 1.0 mi
go 0.1 mi
total 1.2 mi
go 0.3 mi
total 1.5 mi
go 0.5 mi
total 2.0 mi
go 0.2 mi
total 2.2 mi

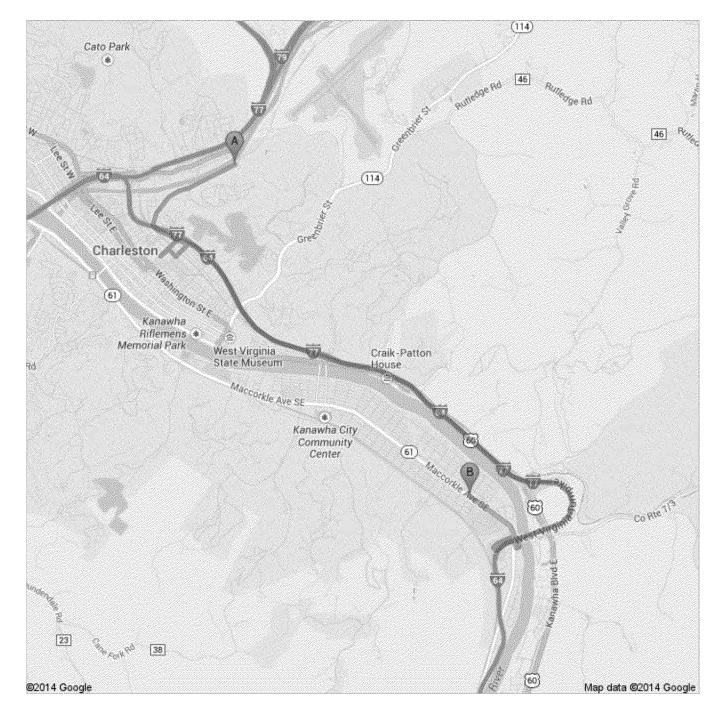
These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Map data ©2014 Google

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.



Directions to 5430 Maccorkle Ave SE, Charleston, WV 25304 8.9 mi – about 13 mins Directions- Site to MedExpress





1015 Barlow Dr, Charleston, WV 25301

1	. Head southwest on Barlow Dr toward Twilight Dr About 1 min	go 0.5 mi total 0.5 mi
2	Continue onto Slack St About 1 min	go 0.5 mi total 1.0 mi
† 3	. Turn left onto Piedmont Rd/Slack St Continue to follow Piedmont Rd About 59 secs	go 0.4 mi total 1.4 mi
ሶ 4	. Turn right onto Morris St	go 0.2 mi total 1.6 mi
r 5	. Take the 2nd right onto Smith St	go 0.1 mi total 1.7 mi
ኅ 6	. Take the 1st left	go 0.1 mi total 1.8 mi
r 7	. Turn right at Lewis St	go 30 ft total 1.8 mi
r 8	. Turn right onto the ramp to I-64 E/I-77 S	go 0.2 mi total 2.0 mi
64) 9	. Keep right at the fork, follow signs for I-64 E/I-77 S/Beckley and merge onto I-64 E/I-77 S About 6 mins	go 5.7 mi total 7.7 mi
7 10	. Take exit 95 for W Virginia 61/Maccorkle Ave	go 0.1 mi total 7.9 mi
ή 11	. Keep left at the fork to continuetoward Maccorkle Ave SE	go 207 ft total 7.9 mi
ጎ 12	. Keep left at the fork, follow signs for Maccorkle Avenue W and merge onto Maccorkle Ave SE Destination will be on the right About 2 mins	go 1.0 mi total 8.9 mi
543	0 Maccorkle Ave SE, Charleston, WV 25304	

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

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EASTWAL

MATERIAL SAFETY DATA SHEET

Revision Date: 10/19/2005

MSDSUSA/ANSI/EN/15000001/291/Version 5.0

0032691126/0004233552

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name	Crude MCHM
Product Identification Number(s)	P1871700
Manufacturer/Supplier	Eastman Chemical Company 200 South Wilcox Drive
	Kingsport, TN 37660-5280 US +14232292000
MSDS Prepared by	Eastman Product Safety and Health
Chemical Name	not applicable
Synonym(s)	972790
Molecular Formula	not applicable
Molecular Weight	not applicable
Product Use	industrial chemical, gasoline blending
OSHA Status	hazardous

For emergency health, safety & environmental information, call 800-EASTMAN.

For emergency transportation information, call CHEMTREC at 800-424-9300 or call 800-EASTMAN.

2. COMPOSITION INFORMATION ON INGREDIENTS

(Typical composition is given, and it may vary. A certificate of analysis can be provided, if available.)

Weight %	Component CAS Registry No.	٠,
68 - 89%	4-methylcyclohexanemethanol 34885-03-5	
4 - 22%	4-(methoxymethyl)cyclohexanemethanol 98955-27-2	
4 - 10%	water 7732-18-5	
5%	methyl 4-methylcyclohexanecarboxylate 51181-40-9	
1%	dimethyl 1,4-cyclohexanedicarboxylate 94-60-0	
1%	methanol 67-56-1	
1 - 2%	1,4-cyclohexanedimethanol 105-08-8	

3. HAZARDS IDENTIFICATION

WARNING!
HARMFUL IF SWALLOWED
CAUSES SKIN AND EYE IRRITATION
AT ELEVATED TEMPERATURES, VAPOR MAY CAUSE IRRITATION OF EYES AND
RESPIRATORY TRACT

HMIS® Hazard Ratings: Health - 2, Flammability -1, Chemical Reactivity - 0

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0032691126/0004233552

HMIS® rating involves data interpretations that may vary from company to company. They are intended only for rapid, general identification of the magnitude of the specific hazard. To deal adequately with the safe handling of this material, all the information contained in this MSDS must be considered.

4. FIRST-AID MEASURES

Inhalation: Move to fresh air. Treat symptomatically, Get medical attention if symptoms persist.
 Eyes: Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Get medical attention. In case of irritation from airborne exposure, move to fresh air. Get medical attention if symptoms persist.

Skin: Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash contaminated clothing before reuse. Destroy or thoroughly clean contaminated shoes.

Ingestion: Call a physician or poison control center immediately. Only induce vomiting at the instruction of medical personnel. Never give anything by mouth to an unconsious person.

5. FIRE FIGHTING MEASURES

Extinguishing Media: water spray, dry chemical, carbon dioxide, alcohol foam

Special Fire-Fighting Procedures: Wear self-contained breathing apparatus and protective clothing.

Hazardous Combustion Products: carbon dioxide, carbon monoxide

Unusual Fire and Explosion Hazards: none

6. ACCIDENTAL RELEASE MEASURES

Use personal protective equipment. Absorb spill with vermiculite or other inert material, then place in a container for chemical waste.

For Large Spills: Flush spill area with water spray. Prevent runoff from entering drains, sewers, or streams.

7. HANDLING AND STORAGE

Personal Precautionary Measures: Avoid breathing vapor from heated material. Avoid contact with eyes, skin, and clothing. Do not taste or swallow. Use only with adequate ventilation. Wash thoroughly after handling.

Prevention of Fire and Explosion: Keep from contact with oxidizing materials. Storage: Keep container closed. Keep away from food, drink and animal foodstuff.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Country specific exposure limits have not been established or are not applicable unless listed below.

METHANOL

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US. ACGIH Threshold Limit Values

Time Weighted Average (TWA): 200 ppm,

US. ACGIH Threshold Limit Values

Short Term Exposure Limit (STEL): 250 ppm,

US. ACGIH Threshold Limit Values

Skin designation: Can be absorbed through the skin.

METHYL ALCOHOL

US. NIOSH: Pocket Guide to Chemical Hazards

Recommended exposure limit (REL): 200 ppm, 260 mg/m3

US. NIOSH: Pocket Guide to Chemical Hazards

Short Term Exposure Limit (STEL): 250 ppm, 325 mg/m3

US. NIOSH: Pocket Guide to Chemical Hazards

Skin designation: Can be absorbed through the skin.

METHYL ALCOHOL; METHANOL

US. California Code of Regulations, Title 8, Sec tion 5155. Airborne Contaminants
Time Weighted Average (TWA) Permissible Exposure Limit (PEL): 200 ppm, 260 mg/m3

US. California Code of Regulations, Title 8, Sec tion 5155, Airborne Contaminants

Ceiling Limit Value: 1,000 ppm.

US. California Code of Regulations, Title 8, Sec tion 5155. Airborne Contaminants

Short Term Exposure Limit (STEL): 250 ppm, 325 mg/m3

US. California Code of Regulations, Title 8, Sec tion 5155. Airborne Contaminants Skin designation: Can be absorbed through the skin.

METHYL ALCOHOL

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910,1000) PEL: 200 ppm, 260 mg/m3

Ventilation: Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Respiratory Protection: If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. In the United States of America, if respirators are used, a program should be instituted to assure compliance with OSHA Standard 63 FR 1152, January 8, 1998, Respirator type: Air-purifying respirator with an appropriate, government approved (where applicable), air-purifying filter, cartridge or canister. Contact health and safety professional or manufacturer for specific information.

Eye Protection: Wear safety glasses with side shields (or goggles). Wear a full-face respirator, if needed

Skin Protection: Wear chemical-resistant gloves, footwear, and protective clothing appropriate for the risk of exposure. Contact health and safety professional or manufacturer for specific

Recommended Decontamination Facilities: eye bath, safety shower, washing facilities

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical Form: liquid

Color: colorless

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Odor: alcohol

Specific Gravity: < 1estimated

Freezing Point: 0 °C Boiling Point: 180 °C

Solubility in Water: appreciable

Flash Point: 112.8 °C (Setaflash closed cup)

Thermal Decomposition Temperature: Thermal stability not tested. Low stability hazard expected

at normal operating temperatures.

10. STABILITY AND REACTIVITY

Stability:

Not fully evaluated. Materials containing similar structural groups

are normally stable.

Incompatibility:

Material reacts with strong oxidizing agents.

Hazardous Polymerization:

Will not occur.

11. TOXICOLOGICAL INFORMATION

Acute toxicity data, if available, are listed below. Additional toxicity data may be available on request.

Oral LD-50:(rat)

825 mg/kg

Dermal LD-50: (rat)

> 2,000 mg/kg (only dose tested)

Skin Irritation (rabbit)

strong

Skin Sensitization: (guinea pig)

none

12. ECOLOGICAL INFORMATION

Acute toxicity data, if available, are listed below. Additional toxicity data may be available on request. Oxygen Demand Data:

BOD-5: 70 mg/g BOD-20: 1,300 mg/g

COD: 2,540 mg/g

Acute Aquatic Effects Data:

96 h LC-50 (fathead minnow): 57.4 mg/l NOEC: 25 mg/l 48 h EC-50 (daphnid): 98.1 mg/l NOEC: 40 mg/l

13. DISPOSAL CONSIDERATIONS

Discharge, treatment, or disposal may be subject to national, state, or local laws. Incinerate.

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MATERIAL SAFETY DATA SHEET

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0032691126/0004233552

14. TRANSPORT INFORMATION

Important Note: Shipping descriptions may vary based on mode of transport, quantities, package size, and/or origin and destination. Consult your company's Hazardous Materials/Dangerous Goods expert for information specific to your situation.

DOT (USA)

Class not regulated

Sea - IMDG (International Maritime Dangerous Goods)

Class not regulated

Air - ICAO (International Civil Aviation Organization)

Class not regulated

15. REGULATORY INFORMATION

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

WHMIS (Canada) Status: controlled

WHMIS (Canada) Hazard Classification: D/2/B

SARA 311-312 Hazard Classification(s):

immediate (acute) health hazard

SARA 313: none, unless listed below

METHANOL

Carcinogenicity Classification (components present at 0.1% or more): none, unless listed below

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0032691126/0004233552

TSCA (US Toxic Substances Control Act): All components of this product are listed on the TSCA inventory. Any impurities present in this product are exempt from listing.

DSL (Canadian Domestic Substances List) and CEPA (Canadian Environmental Protection Act):

One or more components of this product are not listed on the DSL. In Canada, its use is restricted to research and development purposes only.

EINECS (European Inventory of Existing Commercial Chemical Substances): One or more components or reactants of this product are not listed on EINECS. In the European Union, its use is restricted to research and development purposes only.

MITI (Japanese Handbook of Existing and New Chemical Substances): One or more components or reactants of this product are not listed in the Handbook. In Japan, its use is restricted to research and development purposes only.

ECL (Korean Toxic Substances Control Act): One or more components of this product are not listed on the Korean inventory. In Korea, its use is restricted to research and development purposes only.

16. OTHER INFORMATION

Visit our website at www.EASTMAN.com or call 001-423-229-2000.

The information contained herein is based on current knowledge and experience; no responsibility is accepted that the information is sufficient or correct in all cases. Users should consider these data only as a supplement to other information. Users should make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal of these materials, the safety and health of employees and customers, and the protection of the environment.

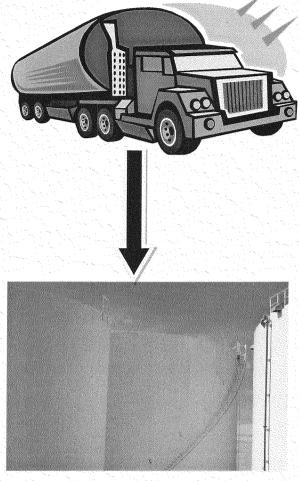
Highlighted areas indicate new or changed information.

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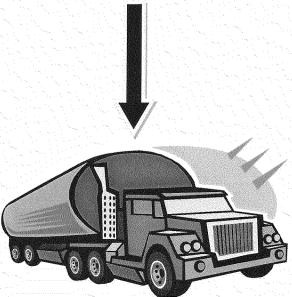
Visit our website at www.EASTMAN.com or call 001-423-229-2000.

Attachment B Process Flow Diagram - MCHM

Product is delivered



Pumped to a storage tank



Pumped out of the tank For delivery to customers

Attachment C

Process Description

ERT receives tank trailer shipment of raw materials. These materials are pumped to the appropriate storage tank. MCHM, is shipped to customers, in bulk tank trailers, without further processing.

Glycerin is occasionally shipped, in bulk tank trailers, without further processing.

Usually, however, glycerin is pumped to another large storage tank, mixed with water and other ingredients to meet customer specifications, and shipped in bulk tank trailers.

Occasionally, high pH glycerin is received. Hydrochloric acid is used to lower the pH. The hydrochloric acid is metered into the glycerin through a closed-loop addition system. Only enough hydrochloric acid is ordered to neutralize the glycerin on-hand. The hydrochloric acid is never stored for more than a few days.



Material Safety Data Sheet

HAZARD WARNINGS	RISK PHRASES	PROTECTIVE CLOTHING
	The health risks of this compound have not been fully determined Exposure may cause irritation of the skin, eyes, and respiratory system.	

Section I. C	hemical Product and Company Idei	ntification	
Chemical Name	4-Methyl-1-cyclohexaner (cis- and trans- mixture)	methanol,	
Catalog Number	M1412	Supplier	TCI America 9211 N. Harborgate St.
Synonym	Cyclohexanemethanol, 4-methyl- (9Cl)		Portland OR 1-800-423-8616
Chemical Formula	C ₈ H ₁₆ O		
CAS Number	34885-03-5	In case of Emergency Call	Chemtrec® (800) 424-9300 (U.S.) (703) 527-3887 (International)

Section II. Composition and Information on Ingredients				
Chemical Name	CAS Number	Percent (%)	TLV/PEL	Toxicology Data
4-Methyl-1-cyclohexanemethan	ol, 34885-03-5	34885-03-5 Min. 98.0 N (GC)	Not available.	Not available.
Costion III Hazarda Idantification				

Section III.	Hazards Identification
Acute Health Effects	No specific information is available in our data base regarding the toxic effects of this material for humans. However, exposure to any chemical should be kept to a minimum. Skin and eye contact may result in irritation. May be harmful if inhaled or ingested. Always follow safe industrial hygiene practices and wear proper protective equipment when handling this compound.
Chronic Health Effects	CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITYNot available. Repeated or prolonged exposure to this compound is not known to aggravate existing medical conditions.

Section IV.	First Aid Measures
Eye Contact	Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.
Skin Contact	In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.
Inhalation If the victim is not breathing, perform mouth-to-mouth resuscitation. Loosen tight clothing such as a waistband. If breathing is difficult, oxygen can be administered. Seek medical attention if respiration improve.	
Ingestion	INDUCE VOMITING by sticking finger in throat. Lower the head so that the vomit will not reenter the mouth and throat. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive.

Section V. Fi	re and Explosion Data		
Flammability	May be combustible at high temperature.	Auto-Ignition	Not available.
Flash Points	Not available.	Flammable Limits	Not available.
Combustion Products	These products are toxic carbon oxides (CO,	CO ₂).	
Fire Hazards	Not available.		
Explosion Hazards	Risks of explosion of the product in presence Risks of explosion of the product in presence		
Fire Fighting Media and Instructions	SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Consult with local fire authorities before attern		operations.

4-метпуі-т-сусіопехапететпапоі,

(cis- and trans- mixture)

Section VI. Accidental Release Measures

> Spill Cleanup Instructions

Absorb with an inert material and put the spilled material in an appropriate waste disposal. Finish cleaning the spill by rinsing any contaminated surfaces with copious amounts of water. Consult federal, state, and/or local authorities for assistance on disposal.

Section VII. Handling and Storage

Handling and Storage Information

Keep away from heat. Mechanical exhaust required. When not in use, tightly seal the container and store in a dry, cool place. Avoid excessive heat and light. Do not breathe gas/fumes/ vapor/spray. Always store away from incompatible compounds such as oxidizing agents.

Exposure Controls/Personal Protection Section VIII.

Engineering Controls

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash station and safety shower is proximal to the work-station location.

Personal Protection

Splash goggles. Lab coat. Vapor respirator. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product. Be sure to use a MSHA/NIOSH approved respirator or equivalent.



Exposure Limits

Not available.

Section IX. Pl	hysical and Chemical Pi	roperties		
Physical state @ 20°C	Liquid. (Colorless Clear.)	Solubility	Not available.	
Specific Gravity	0.92 (water=1)			
Molecular Weight	128.21	Partition Coefficient	Not available.	**********
Boiling Point	197°C (386.6°F)	Vapor Pressure	Not available.	
Melting Point	Not available.	Vapor Density	Not available.	
Refractive Index	Not available.	Volatility	Not available.	
Critical Temperature	Not available.	Odor	Not available.	
Viscosity	Not available.	Taste	Not available.	

Stability and Reactivity Data Section X.

Stability

This material is stable if stored under proper conditions. (See Section VII for instructions)

Conditions of Instability

Avoid excessive heat and light.

Incompatibilities

Reactive with oxidizing agents.

Section XI. Toxicological Information Not available. RTECS Number

Routes of Exposure

Eye Contact. Ingestion. Inhalation.

Toxicity Data

Not available.

Chronic Toxic Effects

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. **DEVELOPMENTAL TOXICITY**Not available.

Repeated or prolonged exposure to this compound is not known to aggravate existing medical conditions.

Acute Toxic Effects

No specific information is available in our data base regarding the toxic effects of this material for humans. However, exposure to any chemical should be kept to a minimum. Skin and eye contact may result in irritation. May be harmful if inhaled or ingested. Always follow safe industrial hygiene practices and wear proper protective equipment when handling this compound.

Freedom_0005891_0025

4-Metnyi-1-cyclonexanemetnanol, (cis- and trans- mixture)

Page 3

Section VII Feelesiaal Information

Section XII. Ecological Information

Ecotoxicity

Not available

Environmental Fate

Not available.

Section XIII. Disposal Considerations

Waste Disposal

Recycle to process, if possible. Consult your local regional authorities. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. Observe all federal, state and local regulations when disposing of the substance.

Section XIV. Transport Information

DOT Classification

Not a DOT controlled material (United States).

PIN Number

Not applicable.

Proper Shipping Name

Not applicable.

Packing Group (PG)

Not applicable.

DOT Pictograms



Section XV. Other Regulatory Information and Pictograms

TSCA Chemical Inventory

This compound is ON the EPA Toxic Substances Control Act (TSCA) inventory list.

(EPA)

WHMIS Classification (Canada)

On NDSL.

EINECS Number (EEC)

Not available.

EEC Risk Statements

Not available.

Japanese Regulatory Data

Not available.

Section XVI. Other Information

Version 1.0

Validated on 11/27/2006.

Printed 11/27/2006.

Notice to Reader

TCI laboratory chemicals are for research purposes only and are NOT intended for use as drugs, food additives, households, or pesticides. The information herein is believed to be correct, but does not claim to be all inclusive and should be used only as a guide. Neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All chemical reagents must be handled with the recognition that their chemical, physiological, toxicological, and hazardous properties have not been fully investigated or determined. All chemical reagents should be handled only by individuals who are familiar with their potential hazards and who have been fully trained in proper safety, laboratory, and chemical handling procedures. Although certain hazards are described herein, we can not guarantee that these are the only hazards which exist. Our MSDS sheets are based only on data available at the time of shipping and are subject to change without notice as new information is obtained. Avoid long storage periods since the product is subject to degradation with age and may become more dangerous or hazardous. It is the responsibility of the user to request updated MSDS sheets for products that are stored for extended periods. Disposal of unused product must be undertaken by qualified personnel who are knowledgeable in all applicable regulations and follow all pertinent safety precautions including the use of appropriate protective equipment (e.g. protective goggles, protective clothing, breathing equipment, facial mask, fume hood). For proper handling and disposal, always comply with federal, state, and local regulations.

Printed 11/27/2006.

SAFETY DATA SHEET

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Product name: Eastman(TM) DMCD

Product No.: EAN 907570. 03041-00, P0304101, P03041N4, P03041NT, P03041NZ, P03041N2,

E0304101, E0304102

Synonyms, Trade Names: 03041-00

Additional identification

Chemical name:

dimethyl 1,4-cyclohexanedicarboxylate

CAS-No.:

94-60-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses: Chemical Intermediate **Uses advised against:** None known.

1.3 Details of the supplier of the safety data sheet

Manufacturer / Supplier

Eastman Chemical Company 200 South Wilcox Drive Kingsport, TN 37660-5280 US +14232292000

Visit our website at www.EASTMAN.com or email emnmsds@eastman.com

1.4 Emergency telephone number:

For emergency health, safety, and environmental information, call 1-423-229-4511 or 1-423-229-2000.

For emergency transportation information, in the United States: call CHEMTREC at 800-424-9300 or call 423-229-2000.

SECTION 2: Hazards identification

WARNING! CAUSES EYE IRRITATION PEROXIDE FORMER

SECTION 3: Composition/information on ingredients

3.1 / 3.2 Substances / Mixtures

General information:

Chemical name	Concentration	Additional identification	Notes
dimethyl 1,4- cyclohexanedicarboxylate	93 - 100%	CAS-No.: 94-60-0 EC No.: 202-347-5	

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methyl 1,4- cyclohexanedicarboxylate	0 - 7%	CAS-No.: 32529-79-6	
methyl 4- methylcyclohexanecarboxylate	0 - 5%	CAS-No.: 51181-40-9	

^{*} All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

SECTION 4: First aid measures

4.1 Description of first aid measures

Inhalation:

Move to fresh air. Treat symptomatically. Get medical attention if symptoms

persist.

Eye contact:

Immediately flush with plenty of water for at least 15 minutes. If easy to do,

remove contact lenses. Get medical attention.

Skin contact:

Wash with soap and water. Get medical attention if symptoms occur.

Ingestion:

Seek medical advice.

4.2 Most important symptoms and effects, both acute and

delayed:

No data available.

4.3 Indication of any immediate medical attention and special treatment needed

Hazards:

None known.

Treatment:

Treat symptomatically.

SECTION 5: Firefighting measures

General fire hazards:

None known.

5.1 Extinguishing media

Suitable extinguishing

media:

Water spray. Dry chemical. Carbon Dioxide. Foam.

Unsuitable extinguishing

media:

None known.

5.2 Special hazards arising from the substance or

mixture:

Forms peroxides of unknown stability. Minimize exposure to air. If peroxide formation is suspected, do not open or move container. After opening, purge container with nitrogen before reclosing. Addition of water or appropriate reducing materials will lessen peroxide formation.

5.3 Advice for firefighters

Special Fire Fighting Procedures:

None known.

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[#] This substance has workplace exposure limit(s).

PBT: persistent, bioaccumulative and toxic substance.

vPvB: very persistent and very bioaccumulative substance.

Special protective equipment for fire-fighters:

Self-contained breathing apparatus and full protective clothing must be

worn in case of fire.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures:

Wear appropriate personal protective equipment.

6.2 Environmental precautions:

Avoid release to the environment.

6.3 Methods and material for containment and cleaning up:

Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Large Spillages: Flush spill area with water spray. Prevent runoff from entering drains, sewers, or streams. Dike for later disposal.

Notification Procedures:

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

SECTION 7: Handling and storage:

7.1 Precautions for safe handling:

Avoid contact with eyes. Wash thoroughly after handling. Minimize exposure to air. After opening, purge container with nitrogen before reclosing. Periodically test for peroxide formation on long-term storage. Do not allow to evaporate to near dryness. Do not distill to near dryness.

7.2 Conditions for safe storage,

Keep container closed.

including any incompatibilities:

7.3 Specific end use(s):

Chemical Intermediate

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational exposure limits

If exposure limits have not been established, maintain airborne levels to an acceptable level.

8.2 Exposure controls

Appropriate engineering controls:

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

General information:

Eye bath. Washing facilities.

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Eye/face protection:

Wear safety glasses with side shields (or goggles).

Skin protection

Hand protection:

It is a good industrial hygiene practice to minimize skin contact.

Other:

No data available.

Respiratory Protection:

If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. In the United States of America, if respirators are used, a program should be instituted to assure compliance with OSHA Standard 63 FR 1152, January 8, 1998. Respirator type: Airpurifying respirator with an appropriate, government approved (where applicable), air-purifying filter, cartridge or canister. Contact health and safety professional or manufacturer for specific information.

Hygiene measures:

Observe good industrial hygiene practices.

Environmental Controls:

No data available.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical State:

Liquid Liquid

Form:

Colorless

Color:

Sweet

Odor Threshold:

No data available.

рН:

Odor:

No data available.

Melting Point

18 - 22 °C

Boiling Point:

263 °C

Flash Point:

94 °C (Tag closed cup)

Evaporation Rate:

No data available.

Flammability (solid, gas):

No data available.

Flammability Limit - Upper (%)-:

No data available.

Flammability Limit - Lower (%)-:

No data available.

Vapor pressure:

13.2 mbar (13.2 °C)

Vapor density (air=1):

6.9

Specific Gravity:

1.10 (35 °C)

Solubility(ies)

Solubility in Water:

Slightly Soluble

Solubility (other):

Autoignition Temperature:

No data available.

Partition coefficient (n-octanol/water):

No data available. 388 °C (ASTM E659)

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Decomposition Temperature:

(DTA) No exotherm to boiling

Dynamic Viscosity:

No data available.

Kinematic viscosity:

No data available.

Explosive properties: Oxidizing properties:

No data available. No data available.

SECTION 10: Stability and reactivity

10.1 Reactivity:

May form peroxides of unknown stability.

10.2 Chemical stability:

Stable

10.3 Possibility of hazardous

Forms peroxides of unknown stability.

reactions:

10.4 Conditions to avoid:

Incompatible materials. Contact with air.

10.5 Incompatible materials:

Strong oxidizing agents.

10.6 Hazardous decomposition

products:

Carbon Dioxide. Carbon Monoxide.

SECTION 11: Toxicological information

Information on likely routes of exposure

Inhalation:

None known.

Ingestion:

None known.

Skin contact:

None known.

Eye contact:

Causes serious eye irritation.

11.1 Information on toxicological effects

Acute Toxicity

Oral

Product:

No data available.

Specified substance(s)

dimethyl 1,4-

Oral LD-50: (Rat, Male.): > 5,000 mg/kg Oral LD-50: (Rat, Female.): 2,812 mg/kg

cyclohexanedicarboxylate

No data available.

methyl 1.4-

cyclohexanedicarboxylate

methyl 4-

No data available.

methylcyclohexanecarboxyl ate

Dermal

Product:

No data available.

Specified substance(s)

dimethyl 1,4-

Dermal LD-50: (Guinea Pig): > 10 ml/kg

cyclohexanedicarboxylate

methyl 1,4-

No data available.

cyclohexanedicarboxylate

methyl 4-

No data available.

methylcyclohexanecarbox ylate

Inhalation

Product:

No data available.

Specified substance(s)

dimethyl 1,4-

LC50 (Rat, 6 h): > 2.91 mg/l

cyclohexanedicarboxylate

methyl 1.4-

No data available.

cyclohexanedicarboxylate

methyl 4-

No data available.

methylcyclohexanecarboxyl

Repeated dose toxicity

Product:

No data available.

Specified substance(s)

dimethyl 1,4-

No data available.

cyclohexanedicarboxylate

methyl 1,4-

No data available.

cyclohexanedicarboxylate

methyl 4-

No data available.

methylcyclohexanecarboxyl

Skin corrosion/irritation:

Product:

No data available.

Specified substance(s)

dimethyl 1,4-

(Guinea Pig, 24 h): Slight

cyclohexanedicarboxylate

methyl 1,4-

No data available.

cyclohexanedicarboxylate

methylcyclohexanecarbox

No data available.

ylate

Serious eye damage/eye

irritation:

Product:

No data available.

Specified substance(s)

dimethyl 1,4-

No data available.

cyclohexanedicarboxylate

No data available.

methyl 1,4-

cyclohexanedicarboxylate

methyl 4-

methylcyclohexanecarbox ylate

No data available.

Respiratory or skin sensitization:

Product:

No data available.

No data available.

Specified substance(s)

dimethyl 1,4cyclohexanedicarboxylate

No data available.

methyl 1,4cyclohexanedicarboxylate

methyl 4methylcyclohexanecarbox ylate

No data available.

Germ cell mutagenicity

In vitro

Product:

No data available.

Specified substance(s)

dimethyl 1,4-

No data available.

cyclohexanedicarboxylate

methyl 1,4-

No data available.

cyclohexanedicarboxylate

No data available.

methyl 4-

methylcyclohexanecarboxyla

In vivo

Product:

No data available.

Specified substance(s)

dimethyl 1,4-

No data available.

cyclohexanedicarboxylate

No data available.

methyl 1,4-

cyclohexanedicarboxylate

No data available.

methyl 4methylcyclohexanecarboxyla

Carcinogenicity

Product:

No data available.

Specified substance(s)

dimethyl 1,4-

No data available.

cyclohexanedicarboxylate

No data available.

methyl 1,4-

cyclohexanedicarboxylate

No data available.

methyl 4methylcyclohexanecarboxyla

Reproductive toxicity

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Product:

No data available.

Specified substance(s)

dimethyl 1.4-

No data available.

cyclohexanedicarboxylate

No data available.

methyl 1,4cyclohexanedicarboxylate

methyl 4-

No data available.

methylcyclohexanecarboxyla

Specific target organ toxicity - single exposure

Product:

No data available.

Specified substance(s)

dimethyl 1,4-

No data available.

cyclohexanedicarboxylate

methyl 1,4-

No data available.

cyclohexanedicarboxylate

methyl 4-

No data available.

methylcyclohexanecarboxyla

Specific target organ toxicity - repeated exposure

Product:

No data available.

Specified substance(s)

dimethyl 1,4-

No data available.

cyclohexanedicarboxylate

methyl 1,4-

No data available.

cyclohexanedicarboxylate

methyl 4-

methylcyclohexanecarboxyla

No data available.

Aspiration hazard

Product:

No data available.

Specified substance(s)

dimethyl 1,4-

No data available.

cyclohexanedicarboxylate

methyl 1,4-

No data available.

cyclohexanedicarboxylate

methyl 4-

methylcyclohexanecarboxyla

No data available.

Other adverse effects:

No data available.

SECTION 12: Ecological information

12.1 Toxicity

Acute toxicity

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Fish

Product:

No data available.

Specified substance(s)

dimethyl 1,4-

LC-50 (Fathead Minnow, 96 h): 23 mg/l

cyclohexanedicarboxylate

methyl 1,4-

cyclohexanedicarboxylate

methyl 4-

methylcyclohexanecarboxyl

No data available. No data available.

Aquatic invertebrates

Product:

No data available.

Specified substance(s)

dimethyl 1,4-

LC-50 (daphnid, 48 h): > 100 mg/l

cyclohexanedicarboxylate

methyl 1.4-

No data available.

cyclohexanedicarboxylate

methyl 4-

methylcyclohexanecarboxyl

No data available.

Chronic Toxicity

Fish

Product:

No data available.

Specified substance(s)

dimethyl 1,4-

cyclohexanedicarboxylate

methyl 1,4-

cyclohexanedicarboxylate

methyl 4-

methylcyclohexanecarboxyl

No data available. No data available.

No data available.

Aquatic invertebrates

Product:

No data available.

Specified substance(s)

dimethyl 1,4-

No data available.

cyclohexanedicarboxylate

methyl 1.4-

No data available.

cyclohexanedicarboxylate

methyl 4-

No data available.

methylcyclohexanecarboxyl

Toxicity to Aquatic Plants

Product:

No data available.

Specified substance(s)

dimethyl 1,4cyclohexanedicarboxylate EC-50 (Alga, 72 h): > 124.6 mg/l NOEC: (Alga, 72 h): > 124.6 mg/l

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methyl 1,4-

cyclohexanedicarboxylate

methyl 4-

methylcyclohexanecarboxyl

No data available.

No data available.

12.2 Persistence and degradability

Biodegradation

Product:

No data available.

Specified substance(s)

dimethyl 1,4-

No data available.

cyclohexanedicarboxylate

methyl 1,4-

No data available.

cyclohexanedicarboxylate

methyl 4-

No data available.

methylcyclohexanecarboxyla

Biological Oxygen Demand:

Product

No data available.

Specified substance(s)

dimethyl 1,4-

No data available.

cyclohexanedicarboxylate

methyl 1,4-

No data available.

cyclohexanedicarboxylate

methyl 4-

methylcyclohexanecarboxyla

No data available.

Chemical Oxygen Demand:

Product

No data available.

Specified substance(s)

dimethyl 1,4-

No data available.

cyclohexanedicarboxylate

No data available.

methyl 1.4cyclohexanedicarboxylate

methyl 4-

methylcyclohexanecarboxyla

No data available.

BOD/COD ratio

Product

No data available.

Specified substance(s)

dimethyl 1,4-

No data available.

cyclohexanedicarboxylate

No data available.

cyclohexanedicarboxylate

No data available.

methyl 4methylcyclohexanecarboxyla

methyl 1,4-

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12.3 Bioaccumulative potential

Product:

No data available.

Specified substance(s)

dimethyl 1,4-

No data available.

cyclohexanedicarboxylate

methyl 1.4-

No data available.

cyclohexanedicarboxylate

methyl 4-

methylcyclohexanecarboxyla

No data available.

12.4 Mobility in soil:

No data available.

Known or predicted distribution to environmental compartments

dimethyl 1,4-

No data available.

cyclohexanedicarboxylate

methyl 1,4-

No data available.

cyclohexanedicarboxylate

methyl 4-

No data available.

methylcyclohexanecarboxylate

No data available.

12.5 Results of PBT and vPvB assessment:

dimethyl 1,4-

cyclohexanedicarboxylate

No data available.

methyl 1,4-

cyclohexanedicarboxylate

No data available.

12.6 Other adverse effects:

methyl 4-

No data available.

methylcyclohexanecarboxylate

No data available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

General information:

No data available.

Disposal Methods:

Dispose of waste and residues in accordance with local authority

requirements. Incinerate. Since emptied containers retain product residue,

follow label warnings even after container is emptied.

SECTION 14: Transport information

Important Note: Shipping descriptions may vary based on mode of transport, quantities, package size, and/or origin and destination. Consult your company's Hazardous Materials/Dangerous Goods expert for information specific to your situation.

DOT

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11/13

Class not regulated

IMDG - International Maritime Dangerous Goods Code

Class 3, Packing Group III when liquid has a flash point at or above 61°C and is offered for transport or is transported at or above its flash point; otherwise, not regulated.

IATA

Class not regulated

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture:

This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

WHMIS (Canada) Status: controlled

WHMIS (Canada) Hazard Classification: D/2/B

SARA 311-312 Hazard Classification(s):

immediate (acute) health hazard

US EPCRA (SARA Title III) Section 313 - Toxic Chemical List

NONE

OSHA: hazardous

TSCA (US Toxic Substances Control Act): This product is listed on the TSCA inventory. Any impurities present in this product are exempt from listing.

DSL (Canadian Domestic Substances List) and CEPA (Canadian Environmental Protection Act): This product is listed on the DSL. Any impurities present in this product are exempt from listing.

AICS / NICNAS (Australian Inventory of Chemical Substances and National Industrial Chemicals Notification and Assessment Scheme): This product is listed on AICS or otherwise complies with NICNAS.

MITI (Japanese Handbook of Existing and New Chemical Substances): This product is listed in the Handbook or has been approved in Japan by new substance notification.

ECL (Korean Toxic Substances Control Act): This product is listed on the Korean inventory or otherwise complies with the Korean Toxic Substances Control Act.

Philippines Inventory (PICCS): This product is listed on the Philippine Inventory or otherwise complies with PICCS.

Inventory of Existing Chemical Substances in China: All components of this product are listed on the Inventory of Existing Chemical Substances in China (IECSC).

SECTION 16: Other information

HMIS® Hazard Ratings:

Health - 2, Flammability - 1, Chemical Reactivity - 1

HMIS® rating involves data interpretations that may vary from company to company. They are intended only for rapid, general identification of the magnitude of the specific hazard. To deal adequately with the safe handling of this material, all the information contained in this MSDS must be considered.

Revision Information:

Not relevant.

Key literature references and

No data available.

sources for data: Training information:

No data available.

Issue Date:

02/01/2013

SDS No: Disclaimer:

This information is provided without warranty. The information is believed to

be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.

Material Safety Data Sheet

Methanol

CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME:

Methanol

OTHER/GENERIC NAMES:

Methyl Alcohol, Carbinol, Wood Alcohol

PRODUCT USE: Solvent

MANUFACTURER: Honeywell

1953 South Harvey Street

Muskegon, MI 49442

DISTRIBUTOR:

VWR International

1310 Goshen Parkway

West Chester, PA 19380

FOR MORE INFORMATION CALL:

(Monday-Friday, 8:00am-5:00pm)

1-800-932-5000

IN CASE OF EMERGENCY CALL:

(24 Hours/Day, 7 Days/Week)

1-800-424-9300 (USA Only)

For Transportation Emergencies:

1-800-424-9300 (CHEMTREC - Domestic) 1-613-996-6666(CANUTEC- Canada)

NOTE: Emergency telephone numbers are to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure, or accident involving chemicals. All non-emergency questions should be directed to customer service.

COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT NAME

Methanol

CAS NUMBER

WEIGHT %

67-56-1

100

Component Information/Information on Non-Hazardous Components

This product is considered to be hazardous according to the criteria specified in 29 CFR 1910.1200 (Hazard Communication Standard) and the Canadian Controlled Product Regulations.

Trace impurities and additional material names not listed above may also appear in Section 15 toward the end of the MSDS. These materials may be listed for local "Right-To-Know" compliance and for other reasons.

HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: This product is a clear, volatile, flammable liquid. Has a slight alcoholic

Methanol

POTENTIAL HEALTH HAZARDS

- SKIN: Toxic in contact with skin. Skin absorption may cause toxic effects similar to those described for inhalation. Repeated or extended contact may cause erythema (reddening of the skin) or dermatitis, resulting from a defatting action on tissue.
- EYES: Irritating to eyes. Symptoms include itching, burning, redness and tearing. Prolonged or acute contact may cause eye damage. This product may cause blindness if it is swallowed.
- INHALATION: Toxic by inhalation. May cause blindness if inhaled. Vapours may cause drowsiness and dizziness. Inhalation of high vapour concentrations can cause CNS-depression and narcosis. Severe overexposure may produce more serious symptoms, including coma and risk of liver damage.
- **INGESTION:** Toxic if swallowed. May be fatal or cause blindness if swallowed. Ingestion of this product may result in central nervous system effects including headache, sleepiness, dizziness, slurred speech and blurred vision.
- **DELAYED EFFECTS:** Repeated or prolonged exposure may cause damage to the liver and central nervous system. This product may cause adverse reproductive effects. Methyl alcohol can produce damage to the optic nerve and central and motor nerves.
- MEDICAL CONDITIONS Pre-existing liver dysfunctions, or eye, skin and/or central nervous system disorders may be aggravated by exposure.

Ingredients found on one of the OSHA designated carcinogen lists are listed below.

<u>INGREDIENT NAME</u>
No component of this product at levels greater than or equal to 0.1% is identified as a carcinogen by ACGIH, IARC, NTP or OSHA.

4. FIRST AID MEASURES

- **SKIN:** Wash off immediately with soap and plenty of water. Take off contaminated clothing and shoes immediately. Wash contaminated clothing before re-use. Call a physician immediately.
- EYES: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician immediately.
- **INHALATION:** Move to fresh air in case of accidental inhalation of vapours. If not breathing, give artificial respiration. If breathing is difficult, give oxygen, provided a qualified operator is available. Call a physician immediately.

INGESTION: DO NOT induce vomiting. Immediate medical attention is required.

ADVICE TO PHYSICIAN: Treat symptomatically.

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Methanol

FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT: 52°F (11°C)

FLASH POINT METHOD: Closed Cup

AUTOIGNITION TEMPERATURE: 867°F (464°C) **UPPER FLAME LIMIT (volume % in air):** LOWER FLAME LIMIT (volume % in air):

FLAME PROPAGATION RATE (solids): Not applicable OSHA FLAMMABILITY CLASS: Class 1B Flammable Liquid

EXTINGUISHING MEDIA:

Use alcohol-resistant foam, carbon dioxide (CO2) or dry chemical.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Highly flammable. Vapours may form explosive mixtures with air. Vapours are heavier than air and may travel along the ground to some distant source of ignition and flash back. Suppress (knock down) gases/vapours/mists with a water spray jet.

Hazardous combustion products may include carbon monoxide, formaldehyde, and carbon dioxide (CO2).

SPECIAL FIRE FIGHTING PRECAUTIONS/INSTRUCTIONS:

Water may be ineffective. Do not use a solid water stream as it may scatter and spread fire. Fire or intense heat may cause violent rupture of packages. Fire-fighters should wear self-contained, NIOSH-approved breathing apparatus and full protective clothing. In the event of fire, cool tanks with water spray. After fire, flush area with water to prevent re-ignition. Do not allow run-off from fire fighting to enter drains or water courses.

ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL OR OTHER RELEASE:

Containment Procedures: Use personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition. Stop flow of material, if this is without risk.

Cleanup Procedures: Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Shovel into suitable container for disposal. Do not use sparking tools. Do not allow product to enter sewer or waterways.

Evacuation Procedures: Keep unnecessary people away. Isolate area.

Special Procedures: Use personal protective equipment. Remove all sources of ignition.

Spills and releases may have to be reported to Federal and/or local authorities. See Section 15 regarding reporting requirements.

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Methanol

7. HANDLING AND STORAGE

NORMAL HANDLING: (Always wear recommended personal protective equipment.)

Ensure all equipment is electrically grounded before beginning transfer operations. Ensure adequate ventilation. Do not allow product to contact skin, eyes and clothing. Do not breathe vapours. Keep away from fire, sparks and heated surfaces. Keep container tightly closed in a dry and well-ventilated place. Not for human consumption.

STORAGE RECOMMENDATIONS:

Keep in a well-ventilated place. Empty containers may retain product residue including Flammable or Explosive vapours. Do not cut, drill, grind, or weld near full, partially full, or empty product containers. Keep away from heat and sources of ignition. Store away from incompatible substances. Re-open used containers with caution. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Store in area designed for storage of flammable liquids. Protect from physical damage.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS:

Provide local and general exhaust ventilation to effectively remove and prevent buildup of any vapours or mists generated from the handling of this product or use product in closed system. Local exhaust ventilation is preferred. Prevent electrostatic charge build-up by using common bonding and grounding techniques.

PERSONAL PROTECTIVE EQUIPMENT

SKIN PROTECTION:

Wear impervious gloves and impervious flame retardant antistatic protective clothing. Gloves must be inspected prior to use. For leak, spills, or other emergency, use full protective equipment.

EYE PROTECTION:

Wear chemical goggles and face shield. Remove contact lenses.

RESPIRATORY PROTECTION:

When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.

ADDITIONAL RECOMMENDATIONS:

Provide eyewash stations and quick-drench shower facilities. High standards of skin care and personal hygiene should be exercised at all times.

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Methanol

EXPOSURE GUIDELINES

Component Exposure Limits

Methanol (67-56-1)

ACGIH:

200 ppm TWA

250 ppm STEL

Skin - potential significant contribution to overall exposure by the cutaneous route

OSHA (Final):

200 ppm TWA; 260 mg/m3 TWA

OSHA (Vacated):

200 ppm TWA; 260 mg/m3 TWA 250 ppm STEL; 325 mg/m3 STEL

Prevent or reduce skin absorption

NIOSH:

200 ppm TWA; 260 mg/m3 TWA

250 ppm STEL; 325 mg/m3 STEL Potential for dermal absorption

Alberta:

200 ppm TWA; 262 mg/m3 TWA

250 ppm STEL; 328 mg/m3 STEL

Substance may be readily absorbed through intact skin

British Columbia:

200 ppm TWA 250 ppm STEL Skin notation

Manitoba:

200 ppm TWA; 260 mg/m3 TWA

250 ppm STEL; 310 mg/m3 STEL

New Brunswick:

200 ppm TWA; 262 mg/m3 TWA 250 ppm STEL; 328 mg/m3 STEL

Skin - potential for cutaneous absorption

Northwest

200 ppm TWA; 262 mg/m3 TWA

Territories:

250 ppm STEL; 328 mg/m3 STEL Skin notation

Nova Scotia:

200 ppm TWA 250 ppm STEL

Skin - potential significant contribution to overall exposure by the cutaneous route

Nunavut:

200 ppm TWA; 262 mg/m3 TWA 250 ppm STEL; 328 mg/m3 STEL

Skin notation

Ontario:

200 ppm TWAEV; 260 mg/m3 TWAEV

250 ppm STEV; 325 mg/m3 STEV

Absorption through skin, eyes, or mucous membranes

Quebec:

200 ppm TWAEV; 262 mg/m3 TWAEV

250 ppm STEV; 328 mg/m3 STEV

Skin designation

Saskatchewan:

262 mg/m3 TWA; 200 ppm TWA

328 mg/m3 STEL; 250 ppm STEL Yukon: 200 ppm TWA; 260 mg/m3 TWA

250 ppm STEL; 310 mg/m3 STEL

Skin notation

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Methanol

PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Clear, colorless liquid

PHYSICAL STATE: Liquid **MOLECULAR WEIGHT: 34.04** CHEMICAL FORMULA: CH3OH

ODOR: Slight alcohol

SPECIFIC GRAVITY (water = 1.0): 0.792 gm/c^3

SOLUBILITY IN WATER (weight %): ~100%

pH: Not applicable **BOILING POINT:** 145.8°F (64.7°C) MELTING POINT: Not applicable VAPOUR PRESSURE: 97 mm Hg

VAPOUR DENSITY (air = 1.0): 1.11

EVAPORATION RATE: ~5

COMPARED TO: Butyl Acetate = 1

% VOLATILES: ~95% FLASH POINT: 52°F (11°C)

(Flash point method and additional flammability data are found in Section 5.)

10. STABILITY AND REACTIVITY

NORMALLY STABLE? (CONDITIONS TO AVOID):

Stable under recommended storage conditions.

Avoid: Heat, flames and sparks. Incompatible products.

INCOMPATIBILITIES:

Avoid strong oxidizers, plastics, rubber and coatings. May react with metallic aluminum and generate hydrogen gas.

HAZARDOUS DECOMPOSITION PRODUCTS:

Hazardous decomposition products include carbon monoxide, formaldehyde, and carbon dioxide (CO2).

HAZARDOUS POLYMERISATION:

Hazardous polymerisation does not occur.

11. TOXICOLOGICAL INFORMATION

Component Analysis - LD50/LC50

Methanol (67-56-1)

Rat: LD50 - Route: Inhalation; Dose: 83.2 mg/L/4H

LD50 - Route: Inhalation; Dose: 64000 ppm/4H

LD50 - Route: Oral; Dose: 5628 mg/kg

Rabbit: LD50 - Route: Dermal; Dose: 15800 mg/kg

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Methanol

IMMEDIATE (ACUTE) EFFECTS:

The product causes irritation of eyes, skin and mucous membranes. Toxic by inhalation, in contact with skin and if swallowed. Methanol can cause blindness. Causes headache, drowsiness or other effects to the central nervous system.

DELAYED (SUBCHRONIC AND CHRONIC) EFFECTS:

In human methanol poisoning, the transformation of methanol to formaldehyde and formic acid can cause metabolic acidosis and ocular injury. Repeated exposure to airborne concentrations in the range of 200 to 375 ppm have been associated with headaches, and at 1200 to 8300 ppm with damaged vision. Neurological damage, giving rise to permanent motor dysfunction may follow methanol poisoning. Repeated skin contact can cause defatting dermatitis with dryness and cracking.

Repeated inhalation exposures to rats caused central nervous system and behavioral effects, and changes to the spleen. Repeated oral exposures to rats caused liver toxicity, central nervous system effects and behavioral changes.

Inhalation exposure of pregnant rats to very high concentrations of methanol in air, 7 hr/day on gestation days 1-19, produced fetotoxic effects (10,000 ppm) and birth defects (20,000 ppm), as well as maternal toxicity. No adverse effects were seen at 5,000 ppm.

Pregnant rats administered methanol orally at very high dose levels (20-35 g/kg) on gestation day 10 produced fetotoxic effects, as well as maternal toxicity.

OTHER DATA:

This material is not known or reported to be carcinogenic by any reference source including IARC, OSHA, NTP, or EPA.

12. ECOLOGICAL INFORMATION

Prevent from entering sewer or waterway. This material may be slightly toxic to aquatic life. Component Analysis - Ecotoxicity - Aquatic Toxicity

Methanol (67-56-1)

Test & Species		Conditions
96 Hr LC50 fathead minnow (28 days old)	29400 mg/L	flow-through
96 Hr LC50 rainbow trout (fingerling)	13 mg/L	
48 Hr LC50 trout	8000 mg/L	
5 min EC50 Photobacterium phosphoreum	43000 mg/L	
15 min EC50 Photobacterium phosphoreum	$40000 \mathrm{mg/L}$	
25 min EC50 Photobacterium phosphoreum	39000 mg/L	

When released into the soil, water or air, this material is expected to readily biodegrade. Methanol is not expected to bioaccumulate.

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Methanol

13. DISPOSAL CONSIDERATIONS

WASTE INFORMATION: U154. This product is a D001 ignitable waste in supplied form. Dispose of as special waste in compliance with local and national regulations. Waste codes should be assigned by the user based on the application for which the product was used. Incineration of waste material in an EPA-approved facility is recommended, allowing a solid, inert residue to form.

OTHER DISPOSAL CONSIDERATIONS: Observe all Federal, State, and Local Environmental regulations.

The information offered here is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

14. TRANSPORT INFORMATION

Domestic:

US DOT PROPER SHIPPING NAME: Methanol

US DOT HAZARD CLASS: 3

US DOT ID NUMBER:

UN1230

International:

US DOT PROPER SHIPPING NAME: Methanol

US DOT HAZARD CLASS: 3, (6.1)

PACKING GROUP: II

PACKING GROUP: II

US DOT ID NUMBER:

UN1230

TDG PROPER SHIPPING NAME: Methanol

TDG HAZARD CLASS:

3, (6.1)

PACKING GROUP: II

TDG ID NUMBER:

UN1230

North American Emergency Response Guide (ERG) Number: 131

For additional information on shipping regulations affecting this material, contact the information number found in Section 1.

15. REGULATORY INFORMATION

TOXIC SUBSTANCES CONTROL ACT (TSCA)

TSCA INVENTORY STATUS: All components are on the U.S. EPA TSCA Inventory List.

Additional TSCA information may exist. Contact VWR if you have questions

OTHER TSCA ISSUES:

regarding your application or use of this product.

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Methanol

SARA TITLE III/CERCLA

"Reportable Quantities" (RQs) and/or "Threshold Planning Quantities" (TPQs) exist for the following ingredients.

INGREDIENT NAME

SARA/CERCLA RQ (lb)

SARA EHS TPO (lb)

Methanol (67-56-1)

000

None

Spills or releases resulting in the loss of any ingredient at or above its RQ requires immediate notification to the National Response Center [(800) 424-8802] and to your Local Emergency Planning Committee.

SECTION 311 HAZARD CLASS:

Immediate. Delayed. Fire.

SARA 313 TOXIC CHEMICALS:

The following ingredients are SARA 313 "Toxic Chemicals". CAS numbers and weight percents are found in Section 2.

INGREDIENT NAME

COMMENT

Methanol (67-56-1)

1.0 % de minimis concentration

STATE RIGHT-TO-KNOW

In addition to the ingredients found in Section 2, the following are listed for state right-to-know purposes.

INGREDIENT NAME

WEIGHT %

COMMENT

Methanol (67-56-1)

100

CA, MA, MN, NJ, PA, RI

ADDITIONAL REGULATORY INFORMATION:

None.

WHMIS CLASSIFICATION (CANADA):

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all information required by CPR.

WHMIS Classification:

B2- Flammable Liquid D1B- Very Toxic Material D2A- Chronic Toxic Effects D2B- Toxic Material

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Methanol

FOREIGN INVENTORY STATUS:

Component Analysis - Inventory

Component	CAS#	TSCA	CAN	EEC	AUST	PHIL	MITI	KOREA	CHINA
Methanol	67-56-1	Yes	DSL	EINECS	Yes	Yes	Yes	Yes	Yes

16. OTHER INFORMATION

CURRENT ISSUE DATE:

January 9, 2006

PREVIOUS ISSUE DATE: New MSDS.

CHANGES TO MSDS FROM PREVIOUS ISSUE DATE ARE DUE TO THE FOLLOWING:

New MSDS.

OTHER INFORMATION:

As per the OSHA Hazard Communication Standard, 1910.1200, the information contained within this MSDS must be given to those persons using this material. For laboratory use only. Not for food or drug use. Do not store with foodstuffs.

KEY/LEGEND:

ACGIH = American Conference of Governmental Industrial Hygienists; CAS = Chemical Abstracts Service; CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act; CFR = Code of Federal Regulations; CPR = Controlled Products Regulations; DOT = Department of Transportation; DSL = Domestic Substances List; EINECS = European Inventory of Existing Commercial Chemical Substances; EPA = Environmental Protection Agency; IARC = International Agency for Research on Cancer; IATA = International Air Transport Association; mg/Kg = milligrams per Kilogram; mg/L = milligrams per Liter; mg/m3 = milligrams per Cubic Meter; MSHA = Mine Safety and Health Administration; NA = Not Applicable or Not Available; NIOSH = National Institute for Occupational Safety and Health; NJTSR = New Jersey Trade Secret Registry; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; SARA = Superfund Amendments and Reauthorization Act; TDG = Transport Dangerous Goods; TSCA = Toxic Substances Control Act; WHMIS = Workplace Hazardous Materials Information System.

End of Sheet #BDH-130

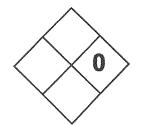
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Reactivity 0

Personal E Protection

Material Safety Data Sheet 1,4-Cyclohexanedimethanol MSDS

Section 1: Chemical Product and Company Identification

Product Name: 1,4-Cyclohexanedimethanol

Catalog Codes: SLC3883

CAS#: 105-08-8

RTECS: Not available.

TSCA: TSCA 8(b) inventory: 1,4-Cyclohexanedimethanol

CI#: Not available.

Synonym: 1,4-Bis(hydroxymethyl)cyclohexane; 1,4-Cyclohexamethylenebis methylol; Cyclohexane-1,4-dimethanol (mixture of cis and trans isomers)

Chemical Name: 1,4-Cyclohexanedimethanol

Chemical Formula: C8-H16-O2

Contact Information:

Sciencelab.com, Inc. 14025 Smith Rd. Houston, Texas 77396

US Sales: 1-800-901-7247

International Sales: 1-281-441-4400

Order Online:

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name

CAS#

% by Weight

{1,4-}Cyclohexanedimethanol

105-08-8

100

Toxicological Data on Ingredients: Not applicable.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention if irritation occurs.

Skin Contact:

Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops. Cold water may be used.

Serious Skin Contact: Not available.

Inhalation

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 316°C (600.8°F)

Flash Points: CLOSED CUP: 161°C (321.8°F). OPEN CUP: 165.56°C (330°F).

Flammable Limits: Not available.

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:

Slightly flammable to flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: As with most organic solids, fire is possible at elevated temperatures

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe dust. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 144.21 g/mole

Color: White.

pH (1% soln/water): Not available. Boiling Point: 286°C (546.8°F)

Melting Point: 41°C (105.8°F) - 61 C Critical Temperature: Not available. Specific Gravity: 1.0381 (Water = 1)

Vapor Pressure: Not applicable.
Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available. Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility:

Soluble in cold water, hot water. Soluble in Ethyl Alcohol

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, dust generation, incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Not available.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 1600 mg/kg [Mouse].

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: May cause skin irritation. Eyes: May cause eye irritation. Inhalation: May cause respiratory tract irritation. Low hazard for usual industrial handling. Ingestion: May cause digestive tract irritation.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations: TSCA 8(b) inventory: 1,4-Cyclohexanedimethanol

Other Regulations: EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (FEC):

This product is not classified according to the EU regulations. S24/25- Avoid contact with skin and eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 05:02 PM

Last Updated: 05/21/2013 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.

LIQUID CALCIUM CHLORIDE MATERIAL SAFETY DATA SHEET

SECTION 1. PRODUCT IDENTIFICATION

Trade Name: Liquid Calcium Chloride

CAS Number: 10043-52-4

Synonyms: Calcium Chloride Aqueous Solution.

EMERGENCY OVERVIEW:

Appearance: Clear to slightly turbid liquid

Odor: No odor WARNING:

- Avoid direct contact with skin, eyes, or clothing.
- Avoid breathing mist.
- Use good personal hygiene and housekeeping.
- Keep container closed. Protect from physical damage.
- Do not store in metals which this solution corrodes.
- Hazard Rankings

HMIS NFPA:

- Health Hazard 0 0
- Fire Hazard 0 0
- Flammability 0 0
- Reactivity 0 0
- Protective Equipment

MINIMUM RECOMMENDED:

- See Section 8 for Details
- This recommendation reflects minimum PPE

SECTION 2. COMPOSITION

Component Name

CAS Registry No.

Concentration (%)

Liquid Calcium Chloride

10043-52-4

20-45

MSDS: Liquid Calcium Chloride Revision Date: July 9, 2012 Page 1 of 5

SECTION 3. HAZARDS IDENTIFICATION

Major Route's of Entry: Inhalation, Skin, Eyes, Ingestion. Signs and Symptoms of Acute Exposure

- Eye Contact: May irritate or burn eyes. Flush with water for 15 minutes.
- Skin Contact: May cause skin irritation. Under conditions of prolonged contact or when moisture is present, superficial burns may result. Contact with abraded or broken skin can cause severe necrosis.
- Inhalation: Mist inhalation may irritate nose, throat, and lungs. May cause nosebleeds.
- Ingestion: Low in toxicity. LD50 (rat): 1.4 g/kg (anhydrous basis). May irritate gastrointestinal tract, cause nausea and vomiting.

Medical Conditions Aggravated By Exposure: None known.

Other Health Warnings: Get medical attention for irritation, ingestion, or discomfort from inhalation.

SECTION 4. FIRST AID MEASURES

Take proper precautions to ensure your own health and safety before attempting rescue or providing first aid.

- Eye Contact: Flush promptly with water, continuing for at least 15 minutes. Get medical attention.
- Skin Contact: Wash with plenty of water.
- Inhalation: Remove to fresh air.
- Ingestion: If conscious, immediately give 2 to 4 glasses of water, and induce vomiting by touching finger to back of throat.

SECTION 5. FIRE FIGHTING MEASURES

NFPA Flammability: NA Classification Flash Point: NA Lower Flammable Limit: NA Upper Flammable Limit: NA

Special Fire: None Fighting Procedures

Extinguishing: This product is nonflammable. Use any agent suitable for the surrounding fire.

Media Unusual Fire: None Fighting Procedures

SECTION 6. ACCIDENTAL RELEASE MEASURES

Protective: None

Measures Spill Management: Dilute small spills cautiously with plenty of water. Mop into metal drum and cover. Many metals are slowly corroded by these solutions. Cautiously spray residue with plenty of water. For large spills, dike up with any available absorbent (commercial, sand, etc.). Pump into same containers and treat as above.

Reporting: None

MSDS: Liquid Calcium Chloride Revision Date: July 9, 2012 Page 2 of 5

SECTION 7. HANDLING AND STORAGE

Handling: Avoid direct contact with skin, eyes, or clothing. Avoid breathing mist. Use good personal hygiene and housekeeping.

Storage: Keep container closed. Protect from physical damage. Do not store in metals which this solution corrodes.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering: None **Personal Controls:**

- Use of gloves, boots, and long sleeved shirts and pants is required to avoid contact Protective with skin.
- Use splash goggles when eye contact may occur.
- Minimize breathing.
- Equipment: vapor, mists, or fumes.
- For misty condition, wear NIOSH approved mist respirator.
- Eye Protection: For misty condition, or when handling solution where there is reasonable probability of eye contact, wear chemical safety goggles and hat. Under these conditions, do not wear contact lenses.
- Hand Protection: Impervious gloves are recommended.
- **Ventilation:** Use local exhaust to capture fumes when handling hot product in confined spaces.
- Respirator not generally required.
- **Body Protection**: As a minimum, wear long-sleeved shirt and trousers, impervious boots, gloves and apron, for routine product use.
- Respiratory: For misty condition, wear NIOSH-approved mist respirator. Respirator should not contain any metals corrodible by these solutions.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Attention: The data below are typical values and do not constitute a specification.

Appearance: Clear to slightly turbid liquid

Odor: No odor

pH: Neutral-Slightly Alkaline

Vapor Pressure: NA Vapor Density (Air = 1): NA

Boiling Point: 20% - 105°C

Melting Point: 45% - 125°C / 34% - 114°C

Specific Gravity: 20% - 1.19 @ 27°C

34% - 1.34 45% - 1.47

Solubility: Readily dispersible in water.

Viscosity: NA

MSDS: Liquid Calcium Chloride Revision Date: July 9, 2012 Page 3 of 5

SECTION 10. STABILITY AND REACTIVITY

Chemical Stability: Stable.

Incompatibility With Other Materials:

- Reacts violently with boron trifluoride (BF3) or a mixture of boron trioxide and calcium oxide.
- Water-reactive materials such as sodium cause an exothermic reaction. Methyl vinyl ether starts runaway polymerization reaction.
- Zinc as in galvanized iron yields hydrogen gas, which may explode under these conditions.

Hazardous Decomposition Products: Fumes of chlorides (Cl-) are given off at temperatures above 1,600°C.

Hazardous Polymerization: Hazard polymerization will not occur.

Conditions to Avoid: None.

SECTION 11. TOXICOLOGICAL INFORMATION

- Low in toxicity.
- LD50 (rat): 1.4 g/kg (anhydrous basis).
- May irritate gastrointestinal tract, cause nausea and vomiting

SECTION 12. ECOLOGICAL INFORMATION ECOTOXICITY

Aquatic Toxicity: TLm96: over 1000 ppm (anhydrous)

Environmental Fate: Material does not cause significant environmental impact.

SECTION 13. DISPOSAL CONSIDERATIONS

Observe all federal, state, and local regulations when disposing of this substance. Not listed as a hazardous waste.

SECTION 14. TRANSPORT INFORMATION

The shipping description below may not represent requirements for all modes of transportation, shipping.

Shipping Name: Not regulated.

Hazard Class: NA

Identification Number: NA Placard: None required

Packing Group: NA

Emergency Response Guide No.: NA

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SECTION 15. REGULATORY INFORMATION

Chemical Inventories: All of the components of this material are on the Toxic Substances Control Act (TSCA) Chemical Inventory or are exempt.

SECTION 16. ADDITIONAL INFORMATION

Scale For NFPA and HMIS Ratings:

0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme.

PPE: Personal Protective Equipment

Index Recommendation: Chronic Effect Indicator. These values are obtained using the guidelines or published evaluations prepared by the National Fire Protections Association (NFPA) or the National Paint and Coating Association (for HMIS ratings).

ABBREVATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT

- TLV Threshold Limit Value
- TWA Time Weighted Average
- STEL Short-term Exposure Limit
- REL/PEL Recommended/Permissible Exposure Limit
- NA Not Applicable
- CAS Chemical Abstract Service Number
- NDA No Data Available
- NE Not Established

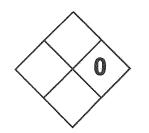
Information in this MSDS was obtained from sources which we believe are reliable. However, the information is provided without any warranty, expressed or implied regarding its correctness. Some information presented and conclusions drawn herein are from sources other than direct test data on the substance itself. This MSDS was prepared and is to be used only for this product. If the product is used as a component in another product, this MSDS information may not be applicable.

Users should make their own investigations to determine the suitability of the information or products for their particular purpose.

The conditions or methods of handling, storage, use, and disposal or the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage, or expense arising out of or in any way connected with handling, storage, use or disposal of the product.

MSDS: Liquid Calcium Chloride Revision Date: July 9, 2012 Page 5 of 5





Reactivity 0

Personal G Protection

Material Safety Data Sheet Glycerin MSDS

Section 1: Chemical Product and Company Identification

Product Name: Glycerin

Catalog Codes: SLG1171, SLG1894, SLG1111, SLG1615

CAS#: 56-81-5

RTECS: MA8050000

TSCA: TSCA 8(b) inventory: Glycerin

Cl#: Not available.

Synonym: 1,2,3-Propanetriol; Glycerol

Chemical Name: Glycerin

Chemical Formula: C3H5(OH)3

Contact Information:

Sciencelab.com, Inc. 14025 Smith Rd. Houston, Texas 77396

US Sales: 1-800-901-7247

International Sales: 1-281-441-4400

Order Online:

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS#	% by Weight
Glycerin	56-81-5	100

Toxicological Data on Ingredients: Glycerin: ORAL (LD50): Acute: 12600 mg/kg [Rat]. 4090 mg/kg [Mouse]. DERMAL (LD50): Acute: 10000 mg/kg [Rabbit]. MIST(LC50): Acute: >570 mg/m 1 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of inquestion, of inhalation.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention if irritation occurs.

Skin Contact:

Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops. Cold water may be used.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature:

370°C (698°F)(NFPA Fire Protection Guide to Hazardous Materials, 13th ed., 2002; NIOSH ICSC, 2001; CHRIS, 2001) 392 C (739 F) (Lewis, 1997)

Flash Points:

CLOSED CUP: 160°C (320°F). (Chemical Hazard Response Information System, 2001; Lewis, 1997). OPEN CUP: 177°C (350.6°F) (Budavari, 2000; Chemical Response Information System, 2001; NIOSH ICSC, 2001) OPEN CUP: 199 C(390 F) (National Fire Protection Association, Fire Protection Guide to Hazardous Materials, 13 ed., 2002)

Flammable Limits: LOWER: 0.9%

Products of Combustion: These products are carbon oxides (CO, CO2), irritating and toxic fumes.

Fire Hazards in Presence of Various Substances:

Slightly flammable to flammable in presence of open flames and sparks, of heat, of oxidizing materials. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Explosive in presence of oxidizing materials.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards:

Glycerin is incompatible with strong oxidizers such as chromium trioxide, potassium chlorate, or potassium permanganate and may explode on contact with these compounds. Explosive glyceryl nitrate is formed from a mixture of glycerin and nitric and sulfuric acids. Perchloric acid, lead oxide + glycerin form perchloric esters which may be explosive. Glycerin and chlorine may explode if heated and confined.

Section 6: Accidental Release Measures

Small Spill:

Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Stop leak if without risk. If the product is in its solid form: Use a shovel to put the material into a convenient waste disposal container. If the product is in its liquid form: Do not get water inside container. Absorb with an inert material and put the spilled material in an appropriate waste disposal. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/furnes/ vapor/spray. Wear suitable protective clothing. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Hygroscopic

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Safety glasses. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 10 (mg/m3) from ACGIH (TLV) [United States] [1999] Inhalation Total. TWA: 15 (mg/m3) from OSHA (PEL) [United States] Inhalation Total. TWA: 10 STEL: 20 (mg/m3) [Canada] TWA: 5 (mg/m3) from OSHA (PEL) [United States] Inhalation Respirable.Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Viscous (Syrupy) liquid.)

Odor: Mild

Taste: Sweet.

Molecular Weight: 92.09 g/mole

Color: Clear Colorless.

pH (1% soln/water): Not available.

Boiling Point: 290°C (554°F)

Melting Point: 19°C (66.2°F)

Critical Temperature: Not available.

Specific Gravity: 1.2636 (Water = 1)

Vapor Pressure: 0 kPa (@ 20°C)

Vapor Density: 3.17 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: The product is more soluble in water; log(oil/water) = -1.8

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, acetone.

Solubility:

Miscible in cold water, hot water and alcohol. Partially soluble in acetone. Very slightly soluble in diethyl ether (ethyl ether). Limited solubility in ethyl acetate. Insoluble in carbon tetrachloride, benzene, chloroform, petroleum ethers, and oils

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Avoid contact with incompatible materials, excess heat and ignition, sources, moisture.

Incompatibility with various substances: Highly reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Hygroscopic. Glycerin is incompatible with strong oxidizers such as chromium trioxide, potassium chlorate, or potassium permanganate. Glycerin may react violently with acetic anhydride, aniline and nitrobenzene, chromic oxide, lead oxide and fluorine, phosphorous triiodide, ethylene oxide and heat, silver perchlorate, sodium peroxide, sodium hydride.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 4090 mg/kg [Mouse]. Acute dermal toxicity (LD50): 10000 mg/kg [Rabbit]. Acute toxicity of the mist (LC50): >570 mg/m3 1 hours [Rat].

Chronic Effects on Humans: May cause damage to the following organs: kidneys.

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals:

TDL (rat) - Route: Oral; Dose: 100 mg/kg 1 day prior to mating. TDL (human) - Route: Oral; Dose: 1428 mg/kg

Special Remarks on Chronic Effects on Humans:

Glycerin is transferred across the plancenta in small amounts. May cause adverse reproductive effects based on animal data (Paternal Effects (Rat): Spermatogenesis (including genetic material, sperm morphology, motility, and count), Testes, epididymis, sperm duct). May affect genetic material.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Low hazard for normal industrial handling or normal workplace conditions. Skin: May cause skin irritation. May be absorbed through skin Eyes: May cause eye irritation with stinging, redness, burning sensation, and tearing, but no eye injury. Ingestion: Low hazard. Low toxicity except with very large doses. When large doses are ingested, it can cause gastrointestinal tract irritation with thirst (dehydration), nausea or vomiting diarrhea. It may also affect behavior/central nervous system/nervous system (central nervous system depression, general anesthetic, headache, dizziness, confusion, insomnia, toxic psychosis, muscle weakness, paralysisconvulsions), urinary system/kidneys(renal failure,

hemoglobinuria), cardiovascular system (cardiac arrhythmias), liver. It may also cause elevated blood sugar. Inhalation: Due to low vapor pressure, inhalation of the vapors at room temperature is unlikely. Inhalation of mist may cause respiratory tract irritation. Chronic Potential Health Effects: Ingestion: Prolonged or repeated ingestion may affect the blood(hemolysis, changes in white blood cell count), endocrine system (changes in adrenal weight), respiratory system, and may cause kidney injury.

Section 12: Ecological Information

Ecotoxicity: Ecotoxicity in water (LC50): 58.5 ppm 96 hours [Trout].

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:

Illinois toxic substances disclosure to employee act: Glycerin Rhode Island RTK hazardous substances: Glycerin Pennsylvania RTK: Glycerin Minnesota: Glycerin Massachusetts RTK: Glycerin Tennessee - Hazardous Right to Know: Glycerin TSCA 8(b) inventory: Glycerin

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC):

Not available S24/25- Avoid contact with skin and eyes.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 1

Reactivity: 0

Personal Protection: g

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:38 PM

Last Updated: 05/21/2013 12:00 PM

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SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

SDS REVISION #: 001

PRODUCT IDENTIFIER:

PPH, stripped

OTHER IDENTIFIERS:

None

CHEMICAL FORMULA:

Complex mixture

5,6% : MCHM

RELEVANT USES:

Mineral flotation

DISTRIBUTED BY:

Freedom Industries, Inc.

1015 Barlow Drive

Charleston, WV 25311

PHONE NUMBERS:

Business - (304) 720-8065 (business hours)

CHEMTREC - (800) 424-9300 (transportation emergencies)

SECTION 2 - HAZARDS IDENTIFICATION

GHS CLASSIFICATION:

Serious eye irritation (Category 2) Skin irritation (Category 2)



Warning!

HAZARD STATEMENTS:

Causes skin irritation and serious eye irritation.

PRECAUTIONARY STATEMENTS:

Prevention

Wear protective gloves, eye protection and face protection. Wash exposed areas thoroughly after handling.

Response

If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. If on skin: Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash it before reuse.

Section 2 continued on next page





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SECTION 2 - HAZARDS IDENTIFICATION (continued)

PRECAUTIONARY STATEMENTS (continued):

Storage

Not applicable

Disposal

Not applicable

HAZARDS NOT OTHERWISE CLASSIFIED: None

SECTION 3 - COMPOSITION / INFORMATION ON INGREDIENTS

Component

<u>%</u>

CAS No.

Polyglycol ethers

100

Proprietary*

SECTION 4 - FIRST AID MEASURES

IN CASE OF EYE CONTACT:

Immediately flush with large amounts of water for at least 15 minutes, lifting upper and lower lids occasionally. Remove contact lenses, if present and easy to do. Get immediate medical attention. Do not use chemical antidote.

IN CASE OF SKIN CONTACT:

Wash exposed area with soap and water. Remove contaminated clothing and launder before reuse.

IF SWALLOWED:

If conscious, immediately give two large glasses of water. Call a physician. Never give anything by mouth to an unconscious person.

IF INHALED:

If affected, move to fresh air. If breathing is difficult, contact a physician.

MOST IMPORTANT SYMPTOMS AND EFFECTS:

Contact with skin or eyes causes irritation, which may be severe, especially in sensitive individuals.

NOTE TO PHYSICIAN:

Treat symptomatically.

^{*}The specific chemical identity is being withheld as "trade secret" in accordance with 29 CFR 1910.1200(i)



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SECTION 5 - FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

This material is not easily ignited, but will burn if heated sufficiently. It meets the OSHA definition of a Class IIIB – combustible liquid.



EXTINGUISHING MEDIA:

Use water fog, alcohol-resistant foam or dry chemical or carbon dioxide.

PROTECTION OF FIREFIGHTERS:

Keep personnel removed from and upwind. Wear full protective clothing and self-contained breathing apparatus with full face-piece. Cool containers with water. Water or foam may cause frothing which can be violent, especially if sprayed into containers of hot, burning liquid.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

PRECAUTIONS, PROTECTIVE EQUIPMENT & EMERGENCY PROCEDURES:

Persons not wearing protective equipment should be excluded from the area of the spill until cleanup has been completed.

CONTAINMENT & CLEAN-UP:

Dike area of spill to prevent spreading and pump liquid to salvage tank. Absorb remaining liquid on vermiculite, floor absorbent or other absorbent material and shovel into containers.

SECTION 7 - HANDLING AND STORAGE

HANDLING:

Avoid contact with skin, eyes and clothing. Avoid inhalation of vapors. Wash thoroughly after handling.

STORAGE:

Keep in closed or covered containers when not in use. Store in cool dry place with adequate ventilation. Do not store near strong oxidizing materials.

SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE GUIDELINES:

Not established for product or components

Section 8 continued on next page



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SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION (continued)

ENGINEERING CONTROLS:

Provide sufficient ventilation to maintain exposure below level of overexposure.

EYE / FACE PROTECTION:

Chemical splash goggles, in compliance with OSHA regulations, are advised.

SKIN PROTECTION:

Wear protective gloves such as Neoprene or Buna-N.

RESPIRATORY PROTECTION:

Not required under normal conditions of use; however, a NIOSH/MSHA supplied air respirator or canister-type respirator equipped with organic vapor cartridge is recommended if there is insufficient ventilation to maintain exposures below established exposure limits.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Clear, colorless or yellow liquid @

68° F (20° C)

Odor: Mild

pH: Unavailable

Freezing Point: <32° F (0° C)

Initial Boiling Point: ~477° F (247° C) Flash Point: >253° F (123° C) PMCC

Evaporation Rate: Slower

(Ethyl Ether = 1)

Upper Explosion Limit: Unavailable

Lower Explosion Limit: Unavailable

Vapor Pressure: Unavailable

Vapor Density: Heavier

Relative Density: ~1.06 @ 68° F (20° C)

Weight per Gallon: ~8.84 Solubility in Water: ~2%

Volatile %: >95%

VOC %: Unavailable)

Autoignition Temperature: Unavailable **Decomposition Temperature**: Unavailable

SECTION 10 - STABILITY AND REACTIVITY

REACTIVITY:

Reacts violently with strong oxidizers

STABILITY:

Stable under normal conditions of 70° F (21° C) and 14.7 psig (760 mm Hg).

POSSIBILITY OF HAZARDOUS REACTIONS:

Avoid contact with strong oxidizers

CONDITIONS TO AVOID:

None anticipated under normal conditions of use

Section 10 continued on next page





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SECTION 10 - STABILITY AND REACTIVITY (continued)

INCOMPATIBILE MATERIALS:

Avoid contact with strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS:

Not anticipated under normal conditions of use.

DECOMPOSITION:

Unknown

SECTION 11 - TOXICOLOGICAL INFORMATION

LIKELY ROUTES OF EXPOSURE:

Skin and eye contact and inhalation

SYMPTOMS:

Eyes: Symptoms include pain and redness.

Skin: Redness

Breathing: Symptoms include irritation of respiratory tract.

Swallowing: Nausea

EFFECTS FROM EXPOSURE:

Immediate: Causes serious irritation to the eyes. May cause skin irritation. Harmful if

swallowed.

Delayed: None known

Chronic: None known

TOXICITY DATA:

Acute oral LD₅₀ (rat) – >2000 mg/kg (for majority component)

Dermal LD₅₀ (rat) – greater than 2000 mg/kg (for majority component)

CARCINOGENICITY

This product is not reported to have any carcinogenic effects. This product (or components) is not listed in IARC Monographs, the current NTP Report on Carcinogens or the current ACGIH TLVs as a carcinogen or potential carcinogen. OSHA does not regulate it as a carcinogen.





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SECTION 12 - ECOLOGICAL INFORMATION

ECOTOXICITY:

No data available

PERSISTENCE AND BIODEGRADABILITY

No data available for product

BIOACCUMULATIVE POTENTIAL:

No data available

MOBILITY IN SOIL:

No data available

OTHER ADVERSE EFFECTS:

No data available

SECTION 13 - DISPOSAL CONSIDERATIONS

Incineration is the recommended disposal method for all chemical wastes. Material collected on absorbent material may be deposited in a landfill in accordance with all applicable local, state and federal regulations.

This product, if disposed of, is not considered a hazardous waste under current RCRA definitions.

SECTION 14 - TRANSPORT INFORMATION

Not regulated under current U.S DOT, TDG (Canadian), ICAO (air) or IMO (water) transport regulations.

SECTION 15 - REGULATORY INFORMATION

TSCA INFORMATION:

All components in this product are in compliance with TSCA Inventory requirements.

SARA:

CERCLA/SARA 302: None CERCLA/SARA 311/312: Acute CERCLA/SARA 313: None





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SECTION 16 - OTHER INFORMATION

PREPARATION DATE: October 15, 2013

SUPERCEDES: Not applicable

REASON FOR REVISION: New SDS

The product information contained herein is believed to be accurate as of the date of the Safety Data Sheet, and is provided without warranty, expressed or implied, as to the results of use of this information or the product to which it relates. Recipient assumes all responsibility for the use of this information and the use (alone or in combination with any other product), storage or disposal of the product, including any resultant personal injury or property damage.

END OF REPORT



Material Safety Data Sheet

The Dow Chemical Company

Product Name: DOWANOL™ PPH Glycol Ether

Issue Date: 02/11/2013 Print Date: 12 Feb 2013

The Dow Chemical Company encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. **Product and Company Identification**

Product Name

DOWANOL[™] PPH Glycol Ether

COMPANY IDENTIFICATION

The Dow Chemical Company 2030 Willard H. Dow Center Midland, MI 48674 **United States**

Customer Information Number:

800-258-2436

EMERGENCY TELEPHONE NUMBER

24-Hour Emergency Contact:

989-636-4400

Local Emergency Contact:

989-636-4400

2. Hazards Identification

Emergency Overview

Color: colourless Physical State: Liquid. Odor: Very slight Hazards of product:

WARNING! Causes eye irritation. Isolate area

OSHA Hazard Communication Standard

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Potential Health Effects

Eye Contact: May cause severe eye irritation. May cause slight corneal injury. Skin Contact: Prolonged contact may cause slight skin irritation with local redness. Skin Absorption: Prolonged skin contact is unlikely to result in absorption of harmful amounts. Inhalation: At room temperature, vapors are minimal due to low volatility. Vapor from heated material or mist may be hazardous on single exposure. For respiratory irritation and narcotic effects: No relevant data found.

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Ingestion: Low toxicity if swallowed. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury.

Aspiration hazard: Based on physical properties, not likely to be an aspiration hazard.

Birth Defects/Developmental Effects: Has caused birth defects in laboratory animals only at doses toxic to the mother.

3. Composition Information

Component	CAS#	Amount
Propylene glycol phenyl ether	770-35-4	> 99.5 %

4. First-aid measures

Description of first aid measures

General advice: First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.

Inhalation: Move person to fresh air; if effects occur, consult a physician.

Skin Contact: Wash skin with plenty of water.

Eye Contact: Immediately flush eyes with water; remove contact lenses, if present, after the first 5 minutes, then continue flushing eyes for at least 15 minutes. Obtain medical attention without delay, preferably from an ophthalmologist. Suitable emergency eye wash facility should be immediately available.

Ingestion: If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel.

Most important symptoms and effects, both acute and delayed

Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), no additional symptoms and effects are anticipated.

Indication of immediate medical attention and special treatment needed

No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. Fire Fighting Measures

Suitable extinguishing media

Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective. Water fog, applied gently may be used as a blanket for fire extinguishment.

Extinguishing Media to Avoid: Do not use direct water stream. May spread fire.

Special hazards arising from the substance or mixture

Hazardous Combustion Products: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Carbon monoxide. Carbon dioxide.

Unusual Fire and Explosion Hazards: Violent steam generation or eruption may occur upon application of direct water stream to hot liquids.

Product Name: DOWANOL[™] PPH Glycol Ether Issue Date: 02/11/2013

Advice for firefighters

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Do not use direct water stream. May spread fire. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage. Water fog, applied gently may be used as a blanket for fire extinguishment.

Special Protective Equipment for Firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

Accidental Release Measures

Personal precautions, protective equipment and emergency procedures: Isolate area. Keep unnecessary and unprotected personnel from entering the area. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection. Refer to Section 7, Handling, for additional precautionary measures.

Environmental precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

Methods and materials for containment and cleaning up: Small spills: Absorb with materials such as: Sand. Vermiculite. Collect in suitable and properly labeled containers. Large spills: Contain spilled material if possible. Pump into suitable and properly labeled containers. See Section 13, Disposal Considerations, for additional information.

7. Handling and Storage

Handling

General Handling: Do not get in eyes. Avoid contact with skin and clothing. Wash thoroughly after handling. Keep container closed. Use with adequate ventilation. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Other Precautions: Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.

Storage

Store in the following material(s): Carbon steel. Stainless steel. Phenolic lined steel drums. Do not store in: Aluminum. Copper. Galvanized iron. Galvanized steel.

Shelf life: Use within, Metal drums. 24 Months Bulk 6 Months

8. Exposure Controls / Personal Protection

Exposure Limits

None established

Personal Protection

Eye/Face Protection: Use chemical goggles.

Skin Protection: Wear clean, body-covering clothing.

Hand protection: Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur. Examples of preferred glove barrier materials

Product Name: DOWANOL[™] PPH Glycol Ether

include: Butyl rubber. Ethyl vinyl alcohol laminate ("EVAL"). Examples of acceptable glove barrier materials include: Natural rubber ("latex"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyvinyl chloride ("PVC" or "vinyl"). NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

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Respiratory Protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. Use an approved air-purifying respirator when vapors are generated at increased temperatures or when dust or mist is present. The following should be effective types of air-purifying respirators: Organic vapor cartridge with a particulate pre-filter.

Ingestion: Use good personal hygiene. Do not consume or store food in the work area. Wash hands before smoking or eating.

Engineering Controls

Ventilation: Use local exhaust ventilation, or other engineering controls to maintain airborne levels below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, general ventilation should be sufficient for most operations. Local exhaust ventilation may be necessary for some operations.

9. Physical and Chemical Properties

Appearance

Physical State

Color Odor

Odor Threshold

рΗ

Melting Point Freezing Point

Boiling Point (760 mmHg) Flash Point - Closed Cup

Evaporation Rate (Butyl

Acetate = 1)

Flammability (solid, gas)

Flammable Limits In Air

Vapor Pressure

Vapor Density (air = 1)

Specific Gravity (H2O = 1) Solubility in water (by

weight)

Partition coefficient, noctanol/water (log Pow)

Autoignition Temperature

Decomposition Temperature

Dynamic Viscosity Kinematic Viscosity

Explosive properties

Oxidizing properties

Liquid Density Molecular Weight Surface tension

Henry's Law Constant (H)

Liquid. colourless

Very slight

No test data available No test data available 11 °C (52 °F) *Literature* 11 °C (52 °F) *Literature*

241.2 °C (466.2 °F) Literature . 115 °C (239 °F) Literature

No test data available

No

Lower: 0.8 %(V) *Literature* **Upper**: Not determined
0.01 hPa @ 20 °C *Literature*

5.27 Literature

1.060 20 °C/20 °C ASTM D4052 15.1 g/l @ 20 °C Literature

1.41 Measured

1,013 hPa 480 °C (896 °F) Literature

No test data available

22.7 mPa.s @ 25 °C Literature

21.4 mm2/s Literature

Not explosive No

8.83 lb/gal @ 25 °C Literature

No test data available

67.8 mN/m @ 20 °C Literature

4.41E-07 atm*m3/mole; 25 °C Estimated.

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10. Stability and Reactivity

Reactivity

No dangerous reaction known under conditions of normal use.

Chemical stability

Thermally stable at typical use temperatures.

Possibility of hazardous reactions

Polymerization will not occur.

Conditions to Avoid: Do not distill to dryness. Product can oxidize at elevated temperatures.

Incompatible Materials: Avoid contact with: Strong acids. Strong bases. Strong oxidizers.

Hazardous decomposition products

Decomposition products depend upon temperature, air supply and the presence of other materials.

Decomposition products can include and are not limited to: Aldehydes. Ketones. Organic acids.

11. Toxicological Information

Acute Toxicity

Ingestion

LD50, rat > 2,000 mg/kg

Dermal

LD50, rat > 2,000 mg/kg

Inhalation

No deaths occurred following exposure to a saturated atmosphere. , 4 h, Aerosol, rat 5.4 mg/l

Eye damage/eye irritation

May cause severe eye irritation. May cause slight corneal injury.

Skin corrosion/irritation

Prolonged contact may cause slight skin irritation with local redness.

Sensitization

Skin

Did not cause allergic skin reactions when tested in guinea pigs.

Respiratory

No relevant data found.

Repeated Dose Toxicity

Based on available data, repeated exposures are not anticipated to cause additional significant adverse effects.

Chronic Toxicity and Carcinogenicity

No relevant data found.

Developmental Toxicity

Has caused birth defects in laboratory animals only at doses toxic to the mother.

Reproductive Toxicity

In animal studies, did not interfere with reproduction.

Genetic Toxicology

In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were predominantly negative.

12. Ecological Information

Toxicity

Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).

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Fish Acute & Prolonged Toxicity

LC50, Pimephales promelas (fathead minnow), static test, 96 h: 280 mg/l

Aquatic Invertebrate Acute Toxicity

LC50, Daphnia magna (Water flea), static test, 48 h, survival: 370 mg/l

Aquatic Plant Toxicity

EC50, Desmodesmus subspicatus (green algae), static test, Growth rate inhibition, 72 h: > 100 mg/l

Persistence and Degradability

Material is readily biodegradable. Passes OECD test(s) for ready biodegradability. Biodegradation rate may increase in soil and/or water with acclimation.

OECD Biodegradation Tests:

	Biodegradation	Exposure Time	Method	10 Day Window	9900000000
П	72 %	28 d	OECD 301F Test	fail	\Box
1	ndirect Photodegrada	ation with OH Radicals			
	1000 d d00 d d	** *		88 - 48 1	
	Rate Constant	Atmosphe	ric Hait-life	Method	(one)
П	3.72E-11 cm3/s		ic Haif-life h	Estimated.	

Bioaccumulative potential

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

Partition coefficient, n-octanol/water (log Pow): 1.41 Measured

Mobility in soil

Mobility in soil: Potential for mobility in soil is very high (Koc between 0 and 50).

Partition coefficient, soil organic carbon/water (Koc): 19 - 21 Estimated.

Henry's Law Constant (H): 4.41E-07 atm*m3/mole; 25 °C Estimated.

13. Disposal Considerations

DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. AS YOUR SUPPLIER, WE HAVE NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION: Composition Information. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Incinerator or other thermal destruction device.

14. Transport Information

DOT Non-BulkNOT REGULATED

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DOT Bulk

NOT REGULATED

IMDG

NOT REGULATED

ICAO/IATA

NOT REGULATED

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. Regulatory Information

OSHA Hazard Communication Standard

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312

Immediate (Acute) Health Hazard	Yes
Delayed (Chronic) Health Hazard	No
Fire Hazard	No
Reactive Hazard	No
Sudden Release of Pressure Hazard	No

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Hazardous Substances List and/or Pennsylvania Environmental Hazardous Substance List:

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Special Hazardous Substances List:

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986)

This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

US. Toxic Substances Control Act

All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.30

CEPA - Domestic Substances List (DSL)

All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

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16. Other Information

Product Literature

Additional information on this product may be obtained by calling your sales or customer service contact. Ask for a product brochure.

Hazard Rating System

NFPA Health Fire

Reactivity

Recommended Uses and Restrictions

Identified uses

Solvent for consumer and industrial applications.

Revision

Identification Number: 82587 / 0000 / Issue Date 02/11/2013 / Version: 3.0 Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

N/A	Not available
W/W	Weight/Weight
OEL	Occupational Exposure Limit
STEL	Short Term Exposure Limit
TWA	Time Weighted Average
ACGIH	American Conference of Governmental Industrial Hygienists, Inc.
DOW IHG	Dow Industrial Hygiene Guideline
WEEL	Workplace Environmental Exposure Level
HAZ_DES	Hazard Designation
Action Level	A value set by OSHA that is lower than the PEL which will trigger the need for
	activities such as exposure monitoring and medical surveillance if exceeded.

The Dow Chemical Company urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.



Material Safety Data Sheet

The Dow Chemical Company

Product Name: DOWANOL(TM) DiPPH Glycol Ether

Issue Date: 08/20/2012 Print Date: 14 Aug 2013

The Dow Chemical Company encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. Product and Company Identification

Product Name

DOWANOL(TM) DiPPH Glycol Ether

COMPANY IDENTIFICATION

The Dow Chemical Company 2030 Willard H. Dow Center Midland, MI 48674 United States

Customer Information Number:

800-258-2436

EMERGENCY TELEPHONE NUMBER

24-Hour Emergency Contact: Local Emergency Contact:

989-636-4400 989-636-4400

2. Hazards Identification

Emergency Overview

Color: Colorless to yellow Physical State: Liquid. Odor: Odorless to mild Hazards of product:

WARNING! Causes eye irritation. May be harmful if absorbed through skin. May be harmful if swallowed. Isolate area.

OSHA Hazard Communication Standard

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Potential Health Effects

Eye Contact: May cause severe eye irritation. May cause slight corneal injury. **Skin Contact:** Brief contact may cause slight skin irritation with local redness.

Skin Absorption: Prolonged skin contact is unlikely to result in absorption of harmful amounts.

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Issue Date: 08/20/2012

Inhalation: At room temperature, vapors are minimal due to low volatility. Vapor from heated material or mist may be hazardous on single exposure. For respiratory irritation and narcotic effects: No relevant data found.

Ingestion: Low toxicity if swallowed. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury.

Aspiration hazard: Based on physical properties, not likely to be an aspiration hazard. **Birth Defects/Developmental Effects:** For the major component(s): Contains component(s) which caused birth defects in laboratory animals only at doses toxic to the mother.

3. Composition Information

Component	CAS#	Amount
Dipropylene glycol phenyl ether	51730-94-0	>= 60.0 %
Propylene glycol phenyl ether	770-35-4	<= 25.0 %
Polypropylene glycol phenyl ether	28212-40-0	<= 15.0 %

4. First-aid measures

Description of first aid measures

General advice: First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.

Inhalation: Move person to fresh air; if effects occur, consult a physician.

Skin Contact: Wash skin with plenty of water.

Eye Contact: Immediately flush eyes with water; remove contact lenses, if present, after the first 5 minutes, then continue flushing eyes for at least 15 minutes. Obtain medical attention without delay, preferably from an ophthalmologist. Suitable emergency eye wash facility should be immediately available.

Ingestion: If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel.

Most important symptoms and effects, both acute and delayed

Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), no additional symptoms and effects are anticipated.

Indication of immediate medical attention and special treatment needed

Maintain adequate ventilation and oxygenation of the patient. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. Fire Fighting Measures

Suitable extinguishing media

Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. General purpose synthetic foams (including AFFF type) or protein foams are preferred if available. Alcohol resistant foams (ATC type) may function. Water fog, applied gently may be used as a blanket for fire extinguishment.

Extinguishing Media to Avoid: Do not use direct water stream. May spread fire.

Special hazards arising from the substance or mixture

Hazardous Combustion Products: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Carbon monoxide. Carbon dioxide.

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Unusual Fire and Explosion Hazards: Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids.

Advice for firefighters

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Do not use direct water stream. May spread fire. Move container from fire area if this is possible without hazard. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage. Water fog, applied gently may be used as a blanket for fire extinguishment.

Special Protective Equipment for Firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures: Evacuate area. Keep upwind of spill. Ventilate area of leak or spill. Only trained and properly protected personnel must be involved in clean-up operations. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection. Refer to Section 7, Handling, for additional precautionary measures.

Environmental precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

Methods and materials for containment and cleaning up: Small spills: Absorb with materials such as: Sand. Vermiculite. Collect in suitable and properly labeled containers. Large spills: Contain spilled material if possible. Pump into suitable and properly labeled containers. See Section 13, Disposal Considerations, for additional information.

7. Handling and Storage

Handling

General Handling: Do not get in eyes, on skin, on clothing. Do not swallow. Avoid breathing vapor or mist. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Other Precautions: Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.

Storage

Store in the following material(s): Carbon steel. Stainless steel. Phenolic lined steel drums. Do not store in: Aluminum. Copper. Galvanized iron. Galvanized steel. See Section 10 for more specific information.

Storage Period:

Bulk

6 Months

Metal drums.

24 Months

8. Exposure Controls / Personal Protection

Exposure Limits

None established

Personal Protection

Eye/Face Protection: Use chemical goggles.

Skin Protection: Use protective clothing chemically resistant to this material. Selection of specific

items such as face shield, boots, apron, or full body suit will depend on the task.

Hand protection: Use gloves chemically resistant to this material. Examples of preferred glove barrier materials include: Butyl rubber. Ethyl vinyl alcohol laminate ("EVAL"). Examples of acceptable glove barrier materials include: Natural rubber ("latex"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyvinyl chloride ("PVC" or "vinyl"). NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

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Respiratory Protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. Use an approved air-purifying respirator when vapors are generated at increased temperatures or when dust or mist is present. The following should be effective types of air-purifying respirators: Organic vapor cartridge with a particulate pre-filter.

Ingestion: Use good personal hygiene. Do not consume or store food in the work area. Wash hands before smoking or eating.

Engineering Controls

Ventilation: Use local exhaust ventilation, or other engineering controls to maintain airborne levels below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, general ventilation should be sufficient for most operations. Local exhaust ventilation may be necessary for some operations.

9. Physical and Chemical Properties

Appearance

Physical State Liquid.

Color Colorless to yellow Odor Odorless to mild Odor Threshold No test data available

pH Not available

Melting PointNot applicable to liquidsFreezing Point< -50 °C (< -58 °F) Literature</th>Boiling Point (760 mmHg)280 °C (536 °F) Calculated

Flash Point - Closed Cup 138 °C (280 °F) Pensky-Martens Closed Cup ASTM D 93

Evaporation Rate (Butyl < 0.01 *Literature*

Acetate = 1)

Flammability (solid, gas)
Flammable Limits In Air
Not applicable to liquids
Lower: Not available
Upper: Not available

Vapor Pressure 0.002 mmHg @ 20 °C Calculated (based on major component)

Vapor Density (air = 1) Not available

Specific Gravity (H2O = 1)

Solubility in water (by

weight)

1.0513 25 °C/25 °C ASTM D4052 30 g/l 1.5 % @ 25 °C Measured

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Partition coefficient, noctanol/water (log Pow)

Autoignition Temperature Decomposition

Temperature Dynamic Viscosity

Liquid Density

Kinematic Viscosity

36 cps @ 25 °C ASTM D445 34.3 cSt @ 25 °C Calculated

component data.

No test data available

No test data available

1.0482 g/cm3 @ 25 °C Digital density meter

No data available for this product. See Section 12 for individual

10. Stability and Reactivity

Reactivity

No dangerous reaction known under conditions of normal use.

Chemical stability

Thermally stable at typical use temperatures.

Possibility of hazardous reactions

Polymerization will not occur.

Conditions to Avoid: Do not distill to dryness. Product can oxidize at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems.

Incompatible Materials: Avoid contact with: Strong acids. Strong bases. Strong oxidizers.

Hazardous decomposition products

Decomposition products depend upon temperature, air supply and the presence of other materials. Decomposition products can include and are not limited to: Aldehydes. Ketones. Organic acids.

11. Toxicological Information

Acute Toxicity

Ingestion

As product: Single dose oral LD50 has not been determined.

For the major component(s): LD50, rat > 2,000 mg/kg

As product: The dermal LD50 has not been determined. For the major component(s): LD50, rat > 2,000 mg/kg

As product: The LC50 has not been determined.

Eye damage/eye irritation

May cause severe eye irritation. May cause slight corneal injury.

Skin corrosion/irritation

Brief contact may cause slight skin irritation with local redness.

Sensitization

Skin

For the major component(s): Did not cause allergic skin reactions when tested in guinea pigs.

Respiratory

No specific, relevant data available for assessment.

Repeated Dose Toxicity

Based on available data, repeated exposures are not anticipated to cause additional significant adverse effects.

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Chronic Toxicity and Carcinogenicity

No specific, relevant data available for assessment.

Developmental Toxicity

For the major component(s): Contains component(s) which caused birth defects in laboratory animals only at doses toxic to the mother.

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Reproductive Toxicity

For the major component(s): In animal studies, did not interfere with reproduction.

Genetic Toxicology

In vitro genetic toxicity studies were negative for component(s) tested. For the component(s) tested: Animal genetic toxicity studies were predominantly negative.

12. Ecological Information

Toxicity

Data for Component: Dipropylene glycol phenyl ether

Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity

LC50, Oncorhynchus mykiss (rainbow trout), static test, 96 h: 204 mg/l

Aquatic Invertebrate Acute Toxicity

EC50, Daphnia magna (Water flea), static test, 48 h, immobilization: 336 mg/l

Aquatic Plant Toxicity

ErC50, Pseudokirchneriella subcapitata (green algae), Growth rate inhibition, 96 h: 188 mg/l

Data for Component: Propylene glycol phenyl ether

Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity

LC50, Pimephales promelas (fathead minnow), static test, 96 h: 280 mg/l

Aquatic Invertebrate Acute Toxicity

LC50, Daphnia magna (Water flea), static test, 48 h, survival: 370 mg/l

Aquatic Plant Toxicity

EC50, Desmodesmus subspicatus (green algae), static test, Growth rate inhibition, 72 h: > 100 mg/l

Data for Component: Polypropylene glycol phenyl ether

No data available.

Persistence and Degradability

Data for Component: Dipropylene glycol phenyl ether

Material is expected to be readily biodegradable.

OECD Biodegradation Tests:

Biodegradation	Exposure Time	Method	10 Day Window
100 %	28 d	OECD 301F Test	pass

Data for Component: Propylene glycol phenyl ether

Material is readily biodegradable. Passes OECD test(s) for ready biodegradability. Biodegradation rate may increase in soil and/or water with acclimation.

OECD Biodegradation Tests:

Biodegradation	Exposure Time	Method	10 Day Window	
72 %	28 d	OECD 301F Test	fail	
Indirect Photodegrad	ation with OH Radicals			
Rate Constant	Atmosphe	ric Half-life	Method	
3.72E-11 cm3/s	3.5	5 h	Estimated.	
Theoretical Oxygen D	emand: 2.31 mg/mg			

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Data for Component: Polypropylene glycol phenyl ether

No data available.

Bioaccumulative potential

Data for Component: Dipropylene glycol phenyl ether

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

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Partition coefficient, n-octanol/water (log Pow): 1.73 Estimated.

Bioconcentration Factor (BCF): < 1; Estimated.

Data for Component: Propylene glycol phenyl ether

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

Partition coefficient, n-octanol/water (log Pow): 1.41 Measured

Data for Component: Polypropylene glycol phenyl ether

Bioaccumulation: No data available.

Mobility in soil

Data for Component: Dipropylene glycol phenyl ether

Mobility in soil: Given its very low Henry's constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process., Potential for mobility in soil is very high (Koc between 0 and 50).

Partition coefficient, soil organic carbon/water (Koc): 12.36 Estimated.

Henry's Law Constant (H): 4.77E-10 atm*m3/mole

Data for Component: Propylene glycol phenyl ether

Mobility in soil: Potential for mobility in soil is very high (Koc between 0 and 50).

Partition coefficient, soil organic carbon/water (Koc): 19 - 21 Estimated.

Henry's Law Constant (H): 4.41E-07 atm*m3/mole; 25 °C Estimated.

Data for Component: Polypropylene glycol phenyl ether

Mobility in soil: No data available.

13. Disposal Considerations

DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. AS YOUR SUPPLIER, WE HAVE NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION: Composition Information. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Incinerator or other thermal destruction device.

14. Transport Information

DOT Non-Bulk

NOT REGULATED

DOT Bulk

NOT REGULATED

IMDG

NOT REGULATED

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ICAO/IATA

NOT REGULATED

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

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15. Regulatory Information

OSHA Hazard Communication Standard

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312

Immediate (Acute) Health Hazard	Ye
Delayed (Chronic) Health Hazard	No
Fire Hazard	No
Reactive Hazard	No
Sudden Release of Pressure Hazard	No

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Hazardous Substances List and/or Pennsylvania Environmental Hazardous Substance List:

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Special Hazardous Substances List:

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986)

This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

US. Toxic Substances Control Act

All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.30

CEPA - Domestic Substances List (DSL)

All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

16. Other Information

Hazard Rating System

NFPA Health

Fire

Reactivity

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Revision

Identification Number: 1062740 / 0000 / Issue Date 08/20/2012 / Version: 1.0 Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

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Legend

~	
N/A	Not available
W/W	Weight/Weight
OEL	Occupational Exposure Limit
STEL	Short Term Exposure Limit
TWA	Time Weighted Average
ACGIH	American Conference of Governmental Industrial Hygienists, Inc.
DOW IHG	Dow Industrial Hygiene Guideline
WEEL	Workplace Environmental Exposure Level
HAZ_DES	Hazard Designation
Action Level	A value set by OSHA that is lower than the PEL which will trigger the need for
	activities such as exposure monitoring and medical surveillance if exceeded.

The Dow Chemical Company urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.

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